C10

Full digital ultrasound diagnostic system

Operation Manual

CE 0123

Diagnostica.dk

Assembly operations, extensions, re-adjustments, modifications or repairs are carried out by personnel authorized by us, and the electrical installation of the relevant room complies with safety standards.

NOTE:

- This device is not intended for home use.

WARNING:

- This device is not intended for treatment.

Label guide

WARNING

A **WARNING** label advises against certain actions or situations that could result in personal injury or death.

NOTE

A **NOTE** label advises against certain actions or situations that could damage equipment, produce inaccurate data, or invalidate a procedure.

Equipment icon description

Type B device

Note! Refer to accompanying documents

Turn-on (general supply)

Disconnect (general supply)

Signal output

Equipotent

IPX7 Watertight-proof

Risky voltage

USB port

RS-232 port

Recycling of the carton

Shipping package icon description

	Handle with Care
	Temperature extremes
	Upward
	Piling limit
	Keep dry
	Protect against heat

Common suggestion of the Equipment regulation

In operation

1. Heat radiation holes are strictly prohibited to be covered.
2. After shutdown, do not switch on the device within 2 - 3 minutes.
3. In scanning, if any abnormal cases are found, stop the scanning immediately and shut down the device.
4. Patient is not allowed to touch any non-application parts.

5. Do not press the keyboard overexertion; otherwise the equipment will be damaged.

After operation

1. Switch off the device.

2. Pull out the plug from the power supply socket instead of pulling the cable.

3. Cleaning the coupling gel on the probe with soft medical sterilized tampon.

4. Put the probe into its box.

5. Operation, storage and transportation environment of the device.

Environmental requirements under the normal operation:

1. Environment temperature range: +5℃～+40℃.

2. Relative humidity range: ≤80%.

3. Atmosphere pressure range: 86KPa～106KPa.

Environment requirements of the storage and transportation:

1. Environment temperature range: - 40℃～+55℃.

2. Relative humidity range: 10%～100%.

3. Atmosphere pressure range: 50KPa～106KPa.

6. Ultrasound might cause harm on human body, please avoid the long time radiation. Appendix B for information of sound output parameters.

7. Please use standard power cable as the input line of the network power supply for the adapter to reduce risk.

8. The power supply plug is the standard three pins plug; its protective grounding pin (terminal) should be connected with the protective grounding line from the main

power.

Contraindication of the usage

- The equipment is not suitable for inspection on organs containing with gas such as lung, etc.
- It is recommended not to check the parts with wounded or acute inflammation to avoid the cross infection.
- Patient in the following situations are not allowed to be checked with vagina and rectum probes:

  inflammation of the vagina,such as trichomonas virginities, colpomycosis, venereal disease etc ; The unmarried, deformity of vagina, menstrual period, postmenopausal vagina atrophy, person with difficulty carry on the vagina ultrasonic examination, colporrhagia, placenta previa patient, etc.
- The following patient is prohibited to use the puncture:

  High blood pressure, coronary heart disease, disturbance of blood coagulation and the bleeding tendency patient.

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Chapter One Preface

1.1 Statement

■Information in this document are not annotated to change. The manufacture shall not state nor observe any warranty basing on this point, and definitely give up any implied warranty basing on any special purpose of selling or making benefit.

■Without previous written permission from the producer, this document must not be photocopied, reproduced or translated into other languages.

■We preserve the right of revision on this document without still further notice.

■Some pictures in this manual, which are schematic diagrams for indication only, may disaccord with the real object, and then the real object should be regarded as the final.

1.2 Manufacturer's warranty

■This guarantee is only available for failures occurred when the device is operated in compliance with the operation manual. And the guaranteed device can only be used in the prescribed range given in manual.

■This guarantee excludes losses or damages caused by external reasons such as thunder struck, earthquake, theft, unsuitable use or abuse and refitting the device.

1.3 Matters need Attention

■To ensure operational safety and long-term stable equipment performance, please read this operation manual closely and understand the device functions, operation and maintenance at all points before operating the device, especially contents of "Warning", "Caution" and "Note".

■Misoperation or inobservance of the instructions given by manufacturer or its agents may result in device damage or personal injury.

■The following convention works through this manual to lay special emphasis on some information.

"Warning": Stands for neglect of it will cause severe personal injury, death or realized property loss.

"Caution": Stands for neglect of it will cause slight personal injury or property damage.

"Note": to remind user of installation, operation or maintenance information. These information is very significant but with no risk.. Any warning against dangers shall not be contained in NOTE.

1.4 Safety labels

■Device labels explanation:

Type B device

Note! Refer to accompanying documents

 Turn-on (general supply)

 Disconnect (general supply)

ON/RESTART

Equipotential

IPX7 Watertight-proof

Risky voltage

USB port

XGA out

■Packing and transportation labels explanation:

	Handle carefully
	Temperature limit
	Upward
	Piling limit
	Keep dry
	Protect against heat

1.5 General tips for device operation

■ In operation

1. Heat radiation holes are strictly prohibited to be covered.
2. After closedown, do not switch on the device within 2 - 3 minutes.
3. On scanning, if any abnormal case is found, stop scanning immediately and shut down the device.
4. Patient is not allowed to touch any non-application parts.
5. Do not press the keyboard too much in case the equipment be damaged.

■ After operation

1. Power off the device.
2. Pull out the plug from power supply socket instead of pulling the cable.
3. Clean off the coupling gel on the probe with soft medical sterilized tampon.
4. put the probe into its box.

1.6 General Safety Message

■Safety of the operator and patients and reliability of the device are taken into consideration during designing and producing, the following safety precaution must be implemented:

1. The device shall be operated by qualified operating staff or under their instructions.
2. The device has already been regulated into its optimal performance. Do not adjust any preset control or switch unless operate as per instructions in the manual.
3. Device operation, storage and transportation environment

● Environmental requirements on normal operation:

Environment temperature range: +5℃～+40℃

Relative humidity range: ≤80%

Atmosphere pressure range: 70kPa～106kPa

● Environment requirements on device storage and transportation:

Environment temperature range: -5℃ ~ +40℃

Relative humidity range: <80%

4. Please use standard power cord as the input line of the network power supply for the adapter to reduce risk.

5. The power supply plug is the standard three pins plug, its protective grounding pin(terminal) should be connected with the protective grounding line of the main power.

■There is no conclusive evidence to show that using the ultrasound diagnostic device with the correct method is actually harmful to the patients or operators. Although the ultrasound may be proved to have a undefined and slight effect on the human body, however, the numerous advantage of the ultrasound is outweigh the unproved disadvantage much.

■Theoretically, the ultrasound may impose two sort of adverse effect on the human body. One is that the ultrasound may produce heat when it passes through the human body, while the other is that the ultrasound may produce the air bubble in the human body. However, there is not any definite evidence for both the two effects.

Warning:

The ultrasound device is safe under the state of low acoustic power. However, whether it is safe under the state of high acoustic power and long-term irradiation is not proved yet, thus please use the device cautiously and use it at the state of the lowest acoustic power and the shortest irradiation time.

■Operations which may effect the ultrasound irradiation range:

1、Depth of focusing: The pulse frequency will be changed when users change the depth of focusing.

2、Probe selection: The change of transducer can lead to the change of ultrasound irradiation range. Different transducer has the different acoustic characteristic and can emit signals with different acoustic frequency and different acoustic power.

3、Freeze: Start/Stop the ultrasound picture is to start/stop the ultrasound irradiation.

4、Scanning Angle :This operation can change the scanning width.

5、Focusing: It can change the position of irradiation focal region.

6、Display Mode(B, M, B+M) : It can change the mode of picture.

Chapter Two System Summary

2.1 Characteristics and Principles

- THE DEVICE is a high resolution convex/linear array scanning ultrasound diagnostic system ,which utilizing the PC control and digital scan converter(DSC) while adopting multiple technologies such as digital beam forming (DBF) , real-time dynamic aperture (RDA), dynamic receive apodization (DRA), dynamic receive focusing (DRF), dynamic frequency scan (DFS), 8-TGC as well as frame correlation , and it can support various linear and convex array probes with a wide range of frequency.
- It provides five display modes as B、B+B、B+M、M、4B and gray scale of 256 levels.
- It provides such functions as real-time ,freeze, magnification, up and down flip, left and right flip ,edge enhancement, gamma calibration of the picture.
- It allows the continuous playback and single frame play of 500 frames at most, while static pictures of 1000 frames can be stored and recalled at most. The patient data can be saved while saving the pictures.
- It provides multiple level regulation for scanning depth, scanning angle, dynamic range, acoustic output power, frame correlation factors ,focus number, distance between focuses, focus position.
- It functions at display of date and time; annotation of name ,sex ,age of patients, doctor and hospital ' s name ;full screen annotation. It allows to switch in the Chinese and English operating interface, to input in Chinese or English input mode, and to choose the arrow mark as well as 40 body posture marks.
- It possesses abundant software such as routine measurement (including distance, area and girth, angle and volume),heart measurement (including distance ,time, slope , heart rate)and obstetric measurement (to estimate the gestational weeks ,expected date of confinement and fetus weight by BPD、CRL、GS、FL、HC、AC)
- This device has the DICOM3.0 port, thus can transmit the picture in the DICOM format. It also provides the color video output, thus it can be connected with the external display with the big screen .In addition, the device has the high speed USB2.0 port ,thus the picture can be saved into the portable storage device and it can be connected with an external video printer. There is a built-in memory with high-capacity which can save a large mount of pictures.
- The device has a injection moulding envelop and the usage of non-industrial frequency transformer switching power supply, programmable parts and surface mounting technology (SMT) make the whole unit highly compact, small in volume and light in weight.
- THE DEVICEconsists three major parts :main unit, probe and display. The standard configuration are convex array probe of C3-1/60R/3.5MHz, vaginal probe of EC1-1/13R/6.5MHz, while the optional configuration are micro-probe of C1-6/20R/5.0MHz, rectal probe of EL3-1/7.5MHz, HF linear array probe of L3-1/7.5MHz, Convex array probe of C5-1/60R/3.5MHz, Endocavity probe of EC1-6/10R/6.5MHz.

2.2 Technical specification

Probe	C3-1/60R/3.5MHz C5-1/60R/3.5MHz convex array probe	EL3-1/7.5MHz endo-rectal probe L3-1/7.5MHz HF linear probe	EC1-1/13R/6.5MHz EC1-6/10R/6.5MHz endo-vaginal probe	C1-6/20R/5.0MHz micro convex probe

Display depth (mm)		240 (max), 16 levels adjustable			
Maximal detect depth (mm)		≥160	≥80	≥60	≥80
Resolution (mm)	Lateral	≤2 (depth≤80) ≤3 (80 < depth≤130)	≤1 (depth≤60)	≤1 (depth≤40)	≤3 (depth≤60)
	Axial	≤2 (depth≤80) ≤3 (80 < depth≤130)	≤1 (depth≤80)	≤1 (depth≤40)	≤1 (depth≤60)
Blind zone(mm)		≤3	≤3	≤3	≤3
Geometric position precision	Horizontal	≤5	≤0	≤5	≤5
	Vertical	≤5	≤5	≤5	≤5
LCD size		12.1 inch			
Display mode		B、B+B、B+M、M、4B			
Image gray scale		256 level			
Cine loop		≥500 frame			
Image storage		≥1000 frames			
Scan angle		Adjustable			
Scan depth		40mm-240mm			
Acoustic power		2 steps			
Dynamic range		100dB-130dB			
Image flip		Up/down, left/right			
Focus position		Adjustable			
Focal space		Adjustable			
Measurement		Distance, circumference, area, volume, heart rate. GA, FW, EDD			
Notation		Date，time，name，sex，age，doctor、hospital name。full screen words edit			
posture mark		40 type			
CPU		1.4G			
Memory		512M			
HDD		≥80G			
DVD		Adjustable			
U		Adjustable			
Compiler		Figure script compiles 、Dump 、Inquiry			
DICOM		Adjustable			

power consumption	100VA

2.3 Range of application

Application in abdominal, Obstetric, Cardiac, small parts sonography.

2.4 Introduction of Clinical Application

Anatomic Site	Diagnostic Items	Probe
Abdominal section	Liver, guts,spleen, kidney, adenexa uteri, etc.	Convex array probe of 3.5MHz
Thoracic section (Hearts of adults and pediatrics)	Exam if there is abnormality in the heart structure and function through analyzing the picture of B mode.	Micro-probe of 5.0MHz
Cutaneous section	The muscle and skeleton system, small organs as well as the abdominal organization and structures (including GIT,kidney and bladder)	Convex array probe of 3.5MHz
Cutaneous section (small organs)	Exam if there is abnormality through rough estimation over the pictures of breast ,TS and didymus, etc.	Linear array probe of 7.5MHz
Head section of neonate	Exam if there is abnormality in the brain volume and structure from the picture of neonate head.	Linear array probe of 7.5MHz
Cutaneous section(Peripheral vessels)	Exam if there if angiostegnosis from the picture of peripheral vessels.	Linear array probe of 7.5MHz

2.5 Per rectum examination procedure

1. Empty the rectum before inspection, after cleansing enema, the patient take left lateral position , put some coupling gel around the endo-rectal probe tip and put on the rubber sleeve (one-time use).
2. During inspection, ask the patient to release the anus or take defecating, then breathe deeply to cooperate doctor's inspection. The first is anus digital examination to know the position, size, texture of the lesion and see if it is painful when pressing it and if there is blood on the finger.
3. Put the probe into anus about 2-3cm slowly, take a close look at the image, then go deep into the recta gradually and check each position. At the same time, press gut gently by putting hand on pubes at lower rump to enhance image definition.

2.6 Vaginam examination procedure

1. Preparation before inspection: It is different from ultrasonic examination per abdomen, no need to suffuse the bladder. But please tell the patient that it is needed to put the probe into her vagina. Explain the course and advantages of per vaginam ultrasonic examination and release her tension.

2. Patient posture：Take the posture of bladder lithotripsy.
3. Scanning method: Put some coupling gel into the disposable sterilizing plastic jacket or a condom and then cover it on probe, apply some coupling gel on the cover and separate the nymphae with left hand to expose vaginal orifice, hold the probe with right hand and put it into the vagina gently can check. The position of probe in vagina will influence the image definition. In general, put the probe closely against vagina vault or cervix. Sometimes it is depending, so move or rotate the probe for a better known of the cavum pelvis. For the moment, there is no hard and fast rule for image position. The near field can be the upper as well as the lower. Please identify the image direction. As same as per abdomen ultrasonic examination, first take vertical section scanning, and check the uterine position, size, outline and each stool section， muscle wall and endomembrane echo state as well as cervix vertical section. Wiggle the probe right and left to display the two ovaries' image. Then contra-rotate probe 90°to scan the uterine and two appendices' cross section. Since most of per vaginam ultrasonic examinations are taken on average examining table instead of special gynecologic examining table, probe operation might be influenced. Some measures can be taken, for example, for some fatty woman or with anteposition of uterus, ask her to hold fists and put it under the hips to raise the rump, which is better for probe operation and complete observation. Sometimes, the target organs are in a higher position, press the abdominal wall gently to make them approach the probe.
4. Limitation：Endo-vaginal probe adopts high frequency probe mostly ,the focal area is within 10cm. Cysts out the range of 10cm can not be observed well thus abdomen examination is necessary to cover the shortage.

2.7 Contraindication

★The equipment is not suitable for inspection on organs containing gas such as lungs, etc.

★It is recommended not to check the parts with wounds or acute inflammation to avoid cross infection.

★Patient in the following situations are not allowed to be checked with EC1-2 and EL1-3 probes:

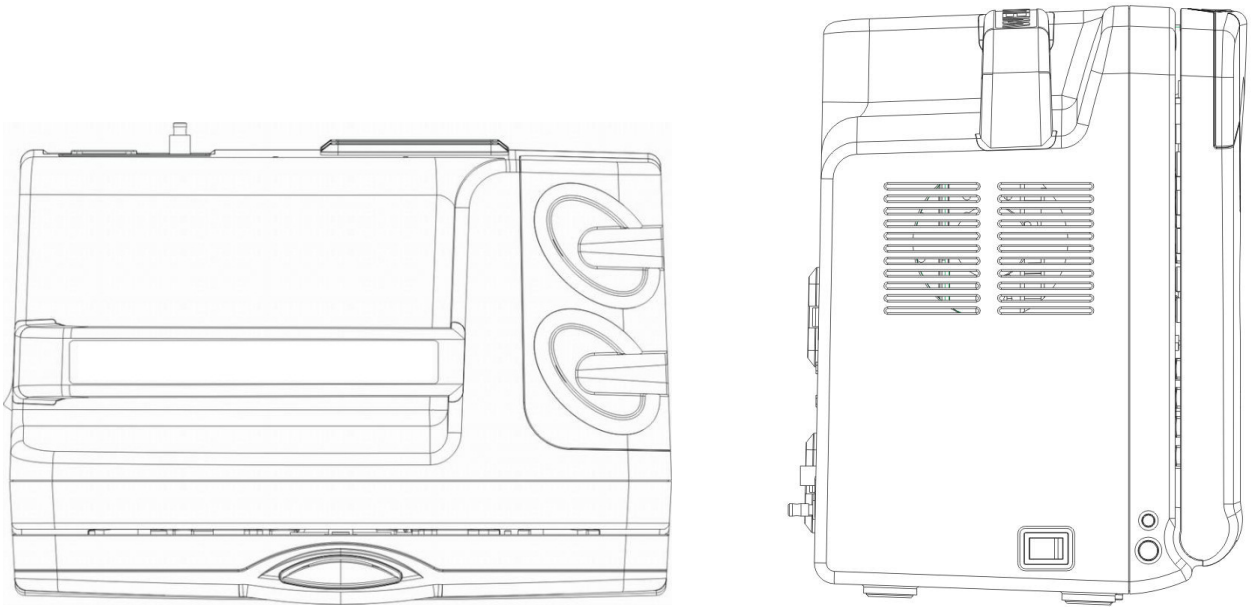
vaginal infection , such as trichomonal vaginitis, colpomycosis, venereal disease etc ; the unmarried, vagina deformity, menstrual period, postmenopausal vagina atrophy, difficulty in per vagina ultrasonic examination, colporrhagia, Pyrilamine placenta previa, etc.

★Puncture is forbidden in the following patients:

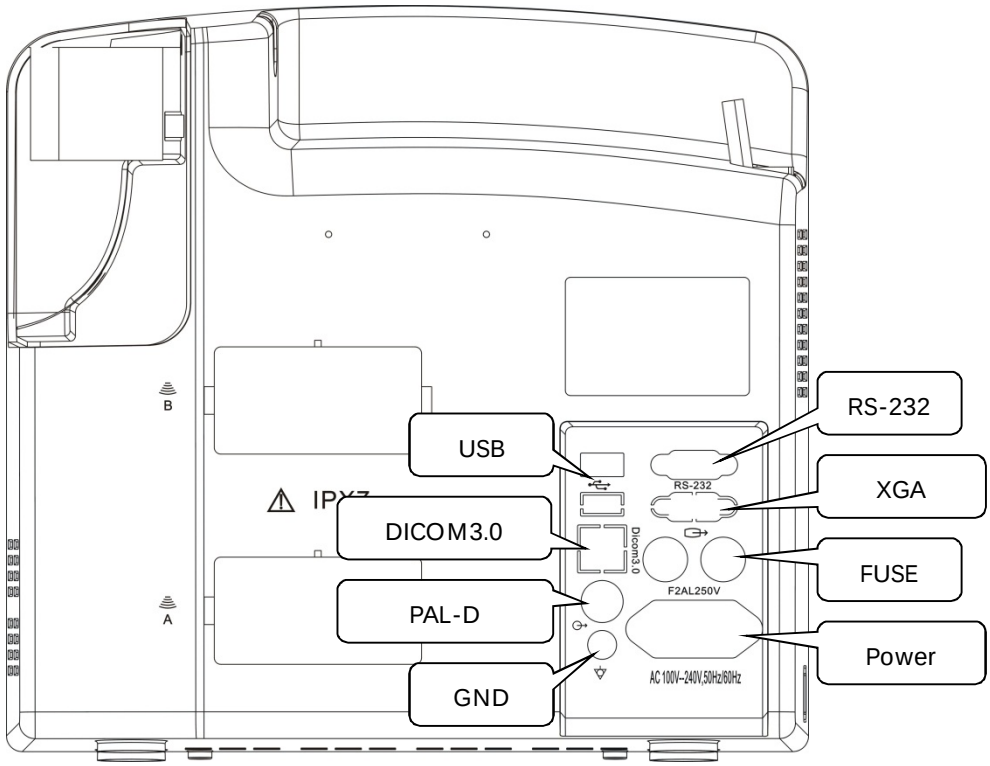
Patients with high blood pressure and coronary heart disease as well as the patients with the difficulty in blood clotting and bleeding propensity.

2.8 Component & Dimensions

2.8.1 Appearance



2.8.2 Panel



Back panel sketch

2.8.3 Standard configuration pieces

- Mainframe, Monitor
- C3-1/60R/3.5MHz convex array probe
- EC1-1/13R/6.5MHz endo-vaginal probe

- PS cable
- 2 pieces of fuse tube F2AL250V
- Coupling gel 250ml
- User Manual
- Final examination report
- Packing List

2.8.4 Optional pieces

- C1-6/20R/5.0MHz micro convex probe
- EL3-1/7.5MHz endo-rectal probe
- L3-1/7.5MHz HF linear probe
- C5-1/60R/3.5MHz convex array probe
- EC1-6/10R/6.5MHz endo-vaginal probe
- printer (HP1020、HP1160)

Warning
Please select spare parts models prescribed above. The manufacturer will not assume the risks such as safety problem, non-expected drop of EMC performance that cause by arbitrary adoption of spare parts out of prescription.

Chapter Three Installation

3.1 Operating environmental requirements

a) Environment temperature range：+5℃～+40℃
b) Relative humidity range：≤80%
c) Atmosphere pressure range：70kPa～106kPa
d) Power supply: a.c.100V～240V,50Hz±1Hz/60Hz±1Hz

When using, avoid strenuous vibration, keep it away from devices with high field, intense magnetic field or high voltage; avoid strong sunlight blazing down on the display; keep the device well-ventilated, moisture proof and dustproof.

3.2 Unpacking inspection

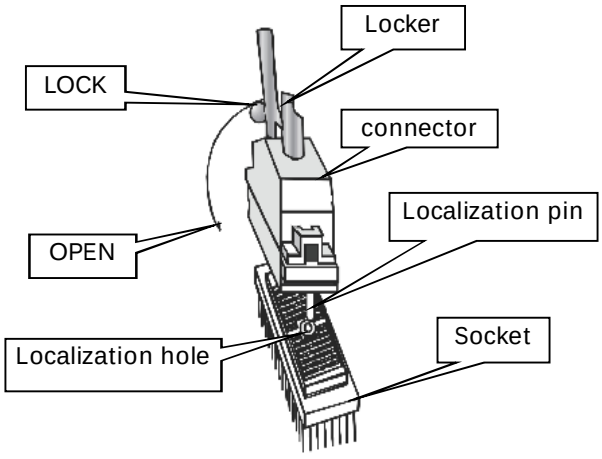
After unpacking, check the device according to "Packing List" and install it according to requirements and methods described in "Installation" after affirm that there is no shipping damage.

Warning
If there is breakage at unpacking check, it is banned to use the device to ensure security.

Warning
The probe should be protected from felling off or crashing and the manufacturer assumes no

3.3 Installation

1. Check the power supply too see if it is in the expected range, then connect the equipment and the power socket with the cable.
2. A 96-core connector is used for electronic convex array probe (see figure).
3. Connection of 96-coreconnector. First, switch the locker on the probe connector to “OPEN”, position the connector localization pin with the hole on the socket, then plug in the connector and switch the locker to “LOCK”. When the locker is moved to “OPEN”, unplug the connector to remove the probe from the main unit.



96-core probe connection sketch

Note
Avoid by all means unplugging or plugging the probe connector at state of log on in case the probe and main unit be damaged. **Once the probe is connected with the main unit, do not unplug nor plug it at discretion in case poor contact happen.**

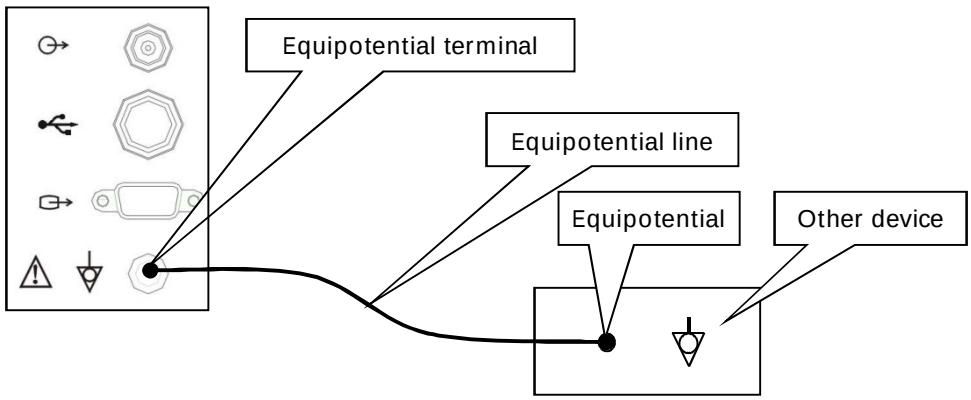
Warning
Must not touch the contact pin in the probe connector.

3.4 Equipotential Connection

■In the hospital doctors and patients are under the influence of the risky and uncontrollable compensating current. In the treatment room he compensating current will occur when there is difference between the connecting device ' s potential and the tangible conducting medium ' s potential . Thus the safest solution is to establish a united equipotential network, and the medical device can be connected into the equipotential network in the treatment room by a socket with a certain angle.

■The socket of the device power supply should be the standard 3-pin socket. The protective rounding pin (terminal) should be connected with the protective grounding wire of the power supply system.

■The " protective grounding " should be performed when there is no protective grounding pin in the socket or the pin is not connected with the protective grounding wire of the power supply system. Users must connect the grounding column onto the ground-wire through a metal wire of which the area of the cross section is not less than 1.0 mm^2.



Note:
The laying of the grounding wire should be performed under the directions of appropriate standards or electricians with appropriate experience.

Note:

Keep the device away from generators, X-ray device, broadcast and transmitting line to avoid the electromagnetic interference. Proximity to the above mentioned device will cause the abnormality of the picture, thus it is strongly recommended that an independent circuit and a protective grounding socket should be utilized with this device. When the same power supply is shared by the device and other electronic or electric device, the best picture quality may be unavailable.

3.5 System recover

If any malfunction occurs wth this system, please recover it with the attached U disc, and the detailed operation procedure is given as follows:

1、 Cut off the power supply of main unit;
2、 Insert the U disc into the USB port;
3、 Turn on the power supply of the main unit ;
4、 Press the Start/Reset Button on the left side of the unit to restart the instrument, now the system will begin to be recovered. When the progressing bar indicate 100%, the system wll shut down the instrument automatically;
5、 Remove the U disc immediately when the system recovery is finished. Restart the system, then the instrument will turn back to the normal working condition.
6、 Do not unplug the U disc during the process of system recovery, or else it might cause serious damage to the system !

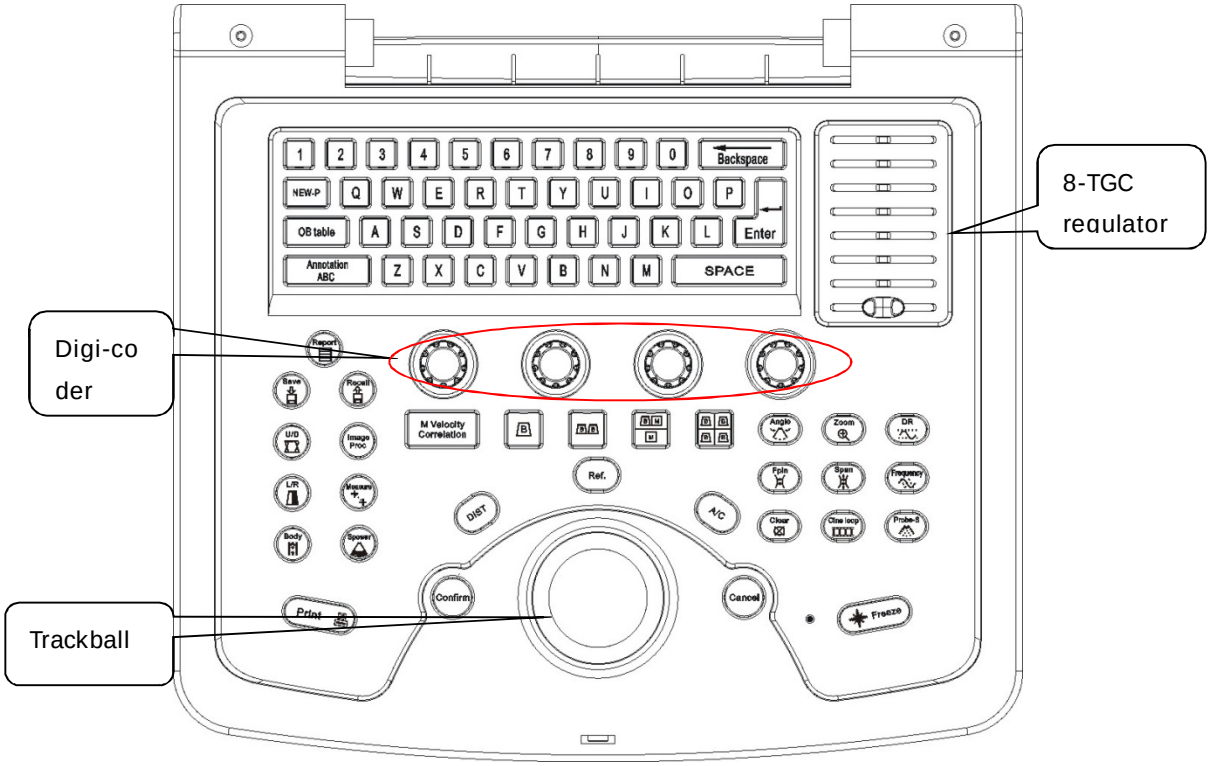
3.6 Install the printer

Install the driver from the free CD attached to the printer following the steps shown in the operation instructions of the printer.

Chapter Four Introduction of Operating Keyboard and Trackball

4.1 Brief Introduction

The keyboard is composed of the character and number key, equipment reset key, basic scanning key, information annotation key, image processing key, measurement operating key, image mode control key ,knob and trackball.



Operating Keyboard sketch

4.2 Character and Number Key

A ~ Z Letter key

Press them under annotation mode or in dialogue box to display corresponding characters after cursor.

SPACE Space key

Press them under annotation mode or in dialog box to input space after cursor.

Backspace Character Back Space key

Press it under annotation mode or in dialogue box to delete the previous characters one by one.

0 ~ 9 Number key

Press them under annotation or in dialog box to display corresponding number such as time, date and age after cursor.

4.3 Equipment Reset and Restart Key

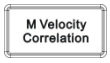
Switch-off / Switch-on key

It is located on the left side of unit body. Press it to switch off or switch on the equipment.

Keyboard Backlight switch key

Press the Backlight key, switch on or switch off the Backlight of the keyboard.

4.4 Basic Scanning Control Key



Frame correlating factor control/M mode velocity control

Scanning angle control

Focus number control

Distances between focuses control

Dynamic range control key

Probe frequency shifting key

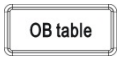
To shift probe type

To shift between freeze and real-time mode

Acoustic power output control

4.5 Information Annotation Key

To clear off the measurement marks and annotation information in the image area



Display obtable

To enter into of exit from the CASE administration

To make an information annotation in any position of image area

The same as “ New Patient ” key

To display the body posture marks menu

To switch the input mode

4.6 Picture Processing Key

To capture the currently displayed pictures

To view the captured pictures

To perform the zooming control

To perform the left and right flip of pictures

To display or close the picture processing menu

To perform the up and down flip of pictures

To printout the pictures and texts

4.7 Measurement Operating Key

Display measurement menu

To enter Distance, Circumference and Area measurement

4.8 Cursor Selecting Key

4.9 Image Mode Control Key

Cine loop control

To enter the B mode display mode

To enter the double B display mode

To enter the BM/M mode display mode

To enter the 4 B display mode

4.10 The knob

Overall gain control

Depth control (Magnification ration change)

Focus position control

Multi-function control

Turn it in combination with

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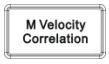
、 

keys for angle, dynamic range, zooming and frame related control. Press it to control the image brightness under the default condition.

4.11 Trackball

The trackball can perform the following functions as to:

- Move the cursor
- Select objects
- Move the measurement marks in measurement
- Move the sampling line under the BM mode
- Move the puncture guiding line when it is displayed
- Move the sampling window under the zooming in mode 2

Note:
Avoid overexertion when using the trackball. Please keep the surface of the trackball clean all along.

Chapter Five Basic Scanning

5.1 Device Preparation

■Check the following items before using the device:

●If the power supply is proper （a.c.100V～240V,50Hz±1Hz/60Hz±1Hz）

●If all the cable has been connected correctly and firmly.

●If the equipment has been grounded correctly and reliably in case the image be subject to interference.

Note:
Do power off the device before probe connection.

5.2 Device Start and Shut-down

1、The power indicator light on the operating panel will be orange after switching on the device from the left side of the unit body. Now the device is under the stand-by state.

2、The power indicator light will turn to be green after pressing the start/shut-down button , and the device will begin to self-check.

3、After self-checking ,the device will starts successfully and go into B mode real-time scanning.

Note:
If the screen prompts the error information, Please power off the device immediately and contact the post-sale service department of Diagnostica

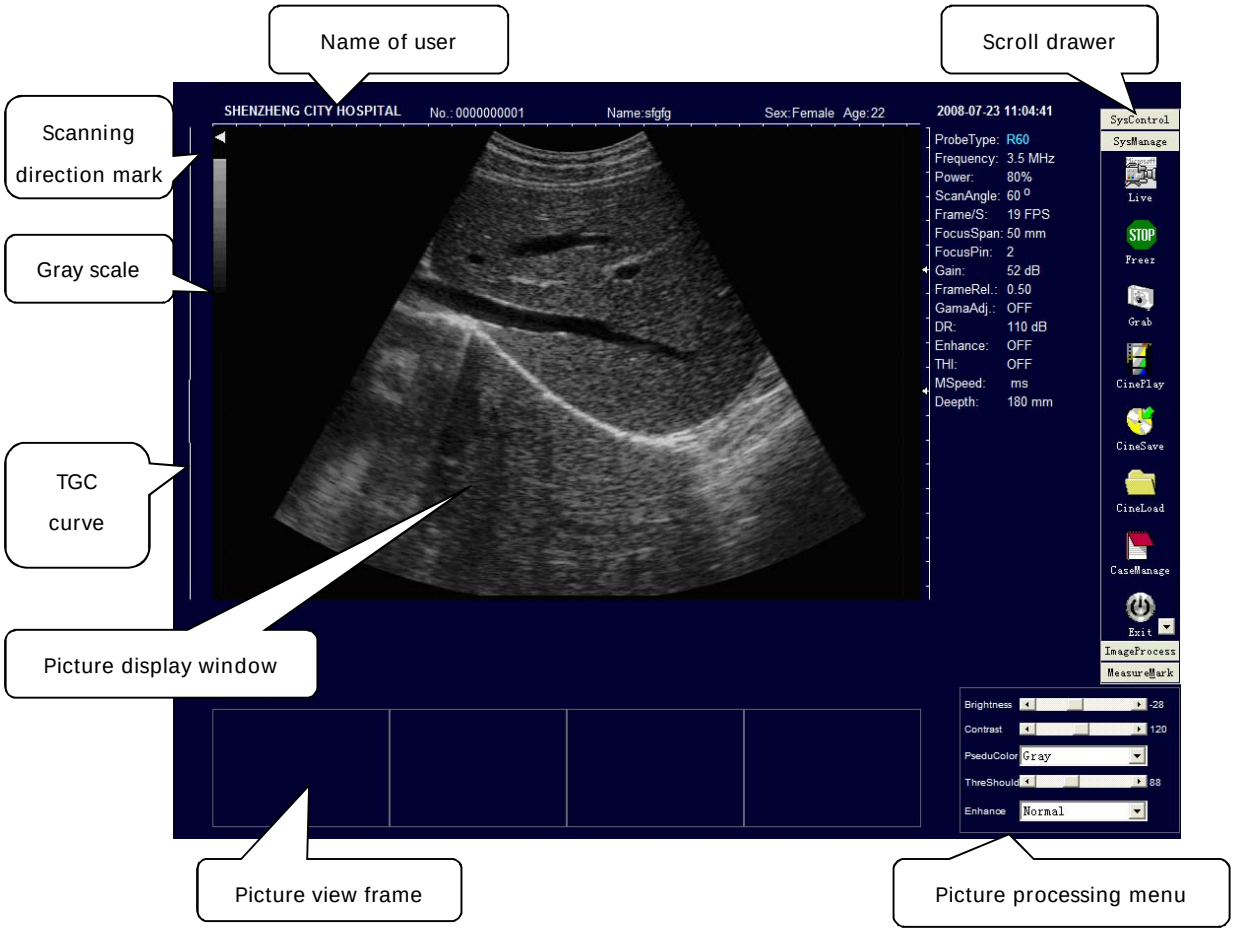
4、Press the button to shut down the equipment, and the device will go into stand-by state while power indicator light will turn to be orange. Then switch off the device from the left side of the unit body to shut down the entire system.

5、When the equipment goes into “ Death ” state caused by maloperation (unable to start the device by pressing any key) , press the key to shut down the device.

Note: It will take about 30 seconds to start the device.

Note:
It is recommended to pull out the alternating current power plug if the device will be long-term unused.
Do not pull out or insert the power plug when the power switch has not been turned off. If device restarting is needed, please waiting for 2-3 minutes after shutting down in case the device be damaged.

5.3 Screen Display



5.4 Probe Selection

■THE DEVICEsupport the linear and convex array probe which can be used on various sites.

■The optimal application sites for various probes are as follows:

Abdomen	Convex array probe of 3.5MHZ
Small organs	Linear array probe of 7.5 MHZ
Heart	Convex array probe of 3.5 MHZ
Blood vessel	Linear array probe of 7.5MHZ
Obstetric	Convex array probe of 3.5 MHZ
Pediatric	Convex array probe of 3.5MHZ

Fetus	Linear array probe of 7.5 MHZ

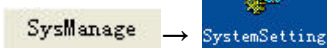
■Both the convex and linear array probes of the same frequency are applicable in various application cases.

■When two probes are connected onto the device ,the user can choose one freely for use.

Note:
Do not press the probe too much when the probes come to contact diagnosed site to avoid damaging the probes or causing any discomfort on the patients
The proper probe and correct frequency should be used for diagnosed site during diagnosis.

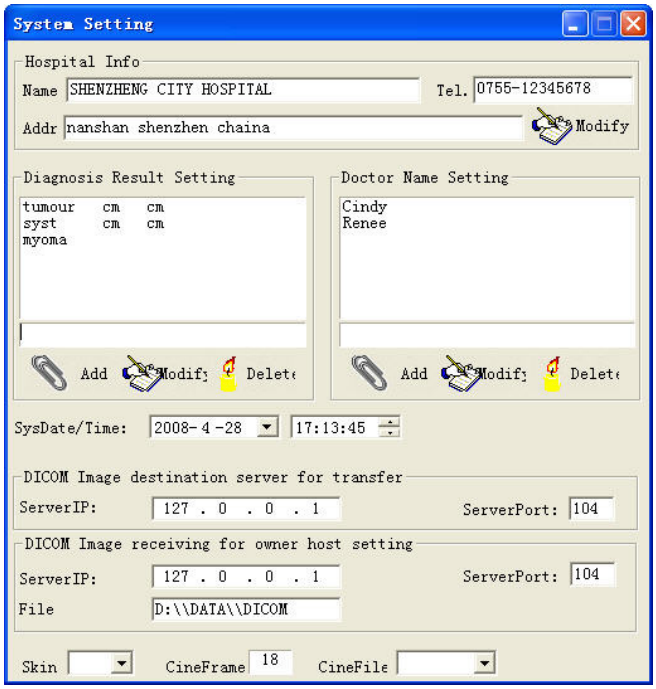
5.5 SystemSetting

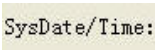
■Right-click the trackball at the bottom of the picture window to pop out a menu .Enter into “ Preset Parameter Invocation ”, then you can select from 8 diagnosis preset modes such as “ Abdomen1”、“Abdomen2”、“Cavity1”、“Cavity2”、“Cardiac”、“SmallOrgan”、“Gynaecology”、“ Obstetric ”. Press the “ SaveCurrentParameter ”, the parameters such as current frequency, depth, focus position, focus number, focus distance, overall gain, dynamic range, brightness and contrast will be saved to the appropriate modes based on the current probe mode. While if the “ SaveAS Gynaecology ” or “ SaveAS Obstetric ” is selected, the current parameters will be saved to the gynaecologic or obstetric diagnosis mode.

■Choose 

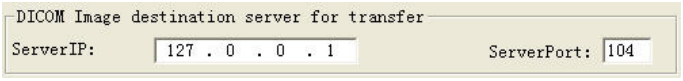
with the trackball to enter the interface for system setup.

: Click them to preset the diagnosis result , doctor name and hospital information, etc.





To change the system date and time here.



To setup the IP address and port of destination server which the DICOM pictures will be transmit to.

To setup this computer as a receiving server of DICOM pictures.

To setup the interface of this workstation to be in B/W or color mode based on the need for observation or user ' s personal favor.

To setup the maximum of frame number for cine and videos between 1~500.

Cine File :

1、Automatic creation——The backup files of cine loop, i.e. cine001~cine003.seq ,can be created automatically under the Directory Temp of software installation directory. When the number of files is over 3, the old files will be overwritten from cine 001.seq. one by one.

2、manual customization ——Setup the access path and name of cine files in the dialogue box.

5.6 Display Adjustment

■processing menu in the bottom right corner of screen,

and you can control the brightness, contrast, pseudo-color, threshold and enhancement in this menu.

■Press under the default state , " brightness " in the bottom right corner of screen will be brightened and turn to be blue. Regulate the knob to change the brightness of image, or Press it again to exit.

5.7 Image Control

5.7.1 Image freeze

Press

to switch between freeze and real-time modes.

5.7.2 Probe Switch

When both two ports are occupied by probes, Press to switch currently active probe. The type of currently active probe is displayed in the top right corner of screen. The relation between probe type and probe mode is as follows:

R60A — — Convex array probe of C3-1/60R/3.5MHz R60B — — Convex array probe of C5-1/60R/3.5MHz

R20 — — Convex array probe of C1-6/20R/5.0MHz R10 — — Endocavity probe of EC1-6/10R/6.5MHz

R13——Endocavity probe of EC1-1/13R/6.5MHz

L40——HF linear probe of L3-1/7.5MHz or rectal probe of EL3-1/7.5MHz

Note:

- **This device has such function as to identify the type of probes automatically,so it can identify and display the type of probes automatically after entry into the work condition of scanning.**
- **When both tow ports are occupied by probes, the device will select the Probe A as the currently active probe automatically after starting the device.**
- **Please shut down the device before change probes or ports connection. The changed probes can not be identified unless restarting the device.**

5.7.3 Display Mode

■The device provides five display modes as B、BB、BM、M、4B

■Press under the real-time state to enter the single B mode (the default mode is single B mode after starting the device)

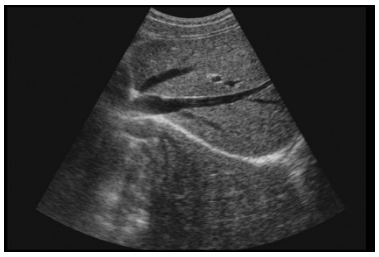
■Press under the real-time state to enter the double B mode. There will be two B pictures displayed on the screen, of which one is a “ frozen ” picture and another is a “ real-time ” picture. Press repeatedly to switch both two pictures between “ frozen ” and “ real-time ” state. Press

to freeze both two pictures.

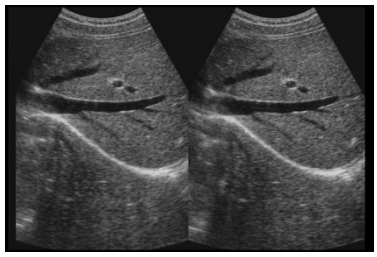
■Press under the real-time state to enter into BM mode. Both the B and M mode (“ BM or “ B+M ” for short)picture will be displayed on the screen. The B mode real time picture

will be displayed on the left side of screen while the M mode real time picture on the right side. Press it again to enter the M display mode, and a M mode picture will be displayed on the screen (Press it repeatedly to switch between the BM and M mode)

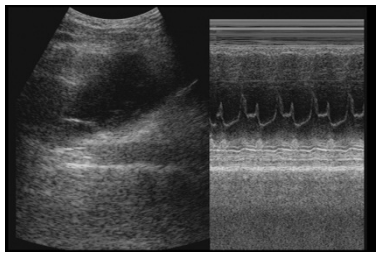
Press to divide the screen into 4 small windows. Drag the cursor into an appropriate position and Press it to display 4 picture of the same mode. Press it again to back to previous mode.



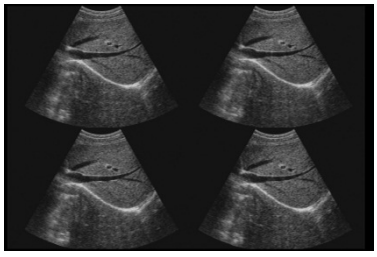
Single B Mode



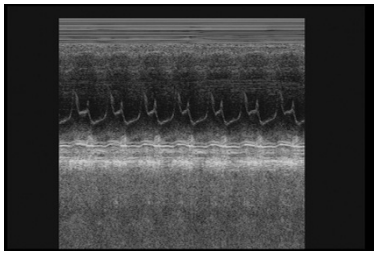
Double B Mode



BM Mode



4B Mode



M mode

Note: In the four display modes which are named as B、BB、BM、M, When you double click , the picture will be displayed on the full screen and printed by vedio printer;Then you click ,the picture will return to original state.

5.7.4 Zooming Control

■Press under the real time or freeze state to change the cursor to be 【十】. Press to define selected area with the trackball, and the selected area will be zoomed in and displayed in the center of the screen. Now you can move the picture through moving the trackball.

■Press , then you can adjust the to zoom in or zoom out the pictures.

■Press

in the picture processing menu, then move the trackball on the picture to display the zoomed in picture of the cursor position on the right side of the screen . Press

to change the magnification ratio between 2-6 times

■Press the

to exit the zooming control .

5.8 Image Quality Control

Note:
The function of image quality control is available only under the real-time scanning mode.

5.8.1 Gain Control

Overall Gain Control

■Turn the knob

to control the overall gain. Turn it clockwise to increase the overall gain, while turn it anticlockwise to decrease the overall gain.

■ The overall gain range is 0～127dB

8-TGC Control

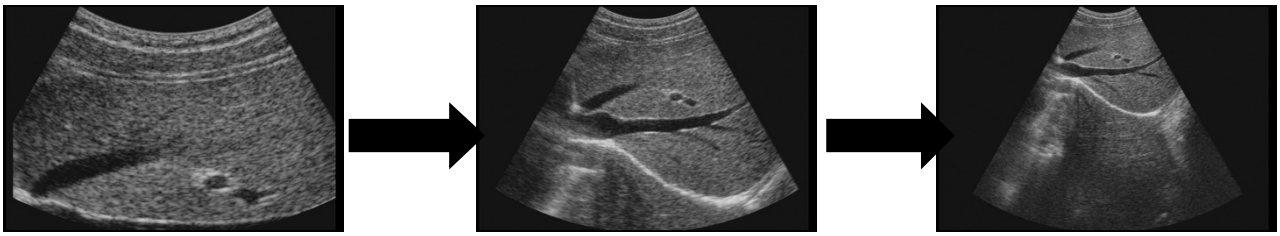
The 8-TGC regulator is on the right keyboard, and it can control the near field , midfield and far field gain in combination with the overall gain potentiometer. Users should regulate the 8-TGC gradually. At the same time, a TGC compensating line will appear on the right screen to display the gain value in each region with direct-viewing to facilitate the diagnosis.

5.8.2 Depth(Magnification Ratio) Control

Regulate the knob

under B mode to change the display depth of current scanning. Turn it clockwise to decrease the currently displayed depth, while turn it anticlockwise to

increase the currently displayed depth, and the current depth is displayed on the bottom right screen.



Depth of 70 Depth of 100 Depth of 240

The range of various probes is given as follows:

Probe Model	Convex Array Probe of C3-1/60R/3.5MHz	Rectal Probe of EL3-1/7.5 MHz HF Linear Array Probe of L3-1/7.5MHz	Micro-Convex Probe of C1-6/20R/5.0MHz	Endocavity Probe of EC1-1/13R/6.5MHz
Depth Range (mm)	70～240	40～90	80～150	50～120

5.8.3 Focus Control

Focus Position Regulation

Regulate the knob

under the non-4B mode to move the focus position up and down.

Focus Number Choose

Press

to change the focus number.. The focus number can be setup to be 4 at most. Press it repeatedly to set the number of focus between 1 and 4 circularly.

Distant Between Focuses Regulation

When the focus number ≥2, the distant between the two focuses can be regulated. The device provides 5 types of distant as 20mm、30mm、40mm、50mm、60mm. Press

and turn the knob
to the 5 types.

Note: When the focus number is set to be 1, the distant between focuses is unable

to be set.

5.8.4 Dynamic Range Control

Press

, then the " Dynamic Range " will be brightened and turn to be blue. At this time, turn the knob to increase or decrease the dynamic range. The dynamic range of this device can be set as 100dB-130dB, however, the default value is recommended to be used by users.

5.8.5 Acoustic Power Control

Press

to regulate the acoustic output power of scanning. The device provides two option as:80mW and 100mW.

Note: To enhance the gain of image , you can enhance the system acoustic power to strengthen the echo signal , however ,it will leads to the slightly heating of the probes. Thus users can make adjustment based on the practical need. The system can adjust the acoustic power under modes of some probes without the settings of users.

5.8.6 Probe Frequency Setup

Press

continuously to change the working frequency of selected probe. The working frequency of various probes can be set as follows:

R60A——2.0MHz、2.5MHz、3.5MHz、4.5MHz、6.0MHz (Convex Array Probe of C3-1/60R/3.5MHz)
R60B——2.0MHz、2.5MHz、3.5MHz、4.5MHz、6.0MHz (Convex Array Probe of C5-1/60R/3.5MHz)
R20——4.5MHz、5.0MHz、5.5MHz (Convex Array Probe of C1-6/20R/5.0MHz)
R13——4.5 MHz、5.5MHz、6.5MHz、7.5MHz、8.5 MHz (Endocavity Probe of EC1-1/R13/6.5MHz)
R10——4.5 MHz、5.5MHz、6.5MHz、7.5MHz、8.5 MHz (Endocavity Probe of EC1-6/R10/6.5MHz)
L40——5.5 MHz、6.5MHz、7.5MHz、8.5MHz、12 MHz (HF Linear of L3-1/7.5MHz or Rectal of EL3-1/7.5MHz)

Note: The acoustic power will be regulated automatically when the working frequency is changed.

5.8.7 Angle Regulation

Press

, then the " angle " on the top right screen will be brightened turn to be blue. Now turn the knob to increase or decrease the scanning angle. The scanning angle of

various probes can be set in the following range:

Convex Array Probe of C3-1/60R/3.5MHz	Convex Array Probe of C5-1/60R/3.5MHz	Endocavity Probe of EC1-6/R10/6.5MHz	Micro-Convex Probe of C1-6/20R/5.0MHz	Endocavity Probe of EC1-1/R13/6.5MHz
60º	72º	151º	90º	120°

Note: Decrease the scanning angle may allow to raise the image frame frequency and increase the frame number of cine loop.

5.8.8 M Speed (Frame Correlation) Control

■Press M Velocity Correlation under the “B/M” or “M” to control the refresh frequency of “B Mode Image” on the screen. This device provides 4 types of refresh frequency as 6mS、8mS、10mS、12mS. Press it repeatedly to setup the refresh frequency circularly. The current refresh frequency is displayed in the “M speed” on the right screen.

■ Press under the “B”, “BB”, “BM”, “M” and “4B” modes, then the “frame correlation” will be brightened an turn to be blue. Now turn the knob to change the frame correlation factor. This device provides 8 types of frame correlation factor as 0.25、0.35、0.45、0.55、0.65、0.75、0.85、0.95 ,and the current selected factor is displayed on the right side of screen.

Note: Brighten the “frame correlation” in the top right corner of screen under B or BB mode before regulating of the frame correlation factor under BM or M mode.

5.9 Cine Loop and Picture Capturing

5.9.1 Picture Capturing

Picture Capturing

■Press Save under real-time or freeze state to capture the current picture into EMS memory and to display in the picture view frame in order.

■ Double-click

in the picture view frame to delete the corresponding picture.

Picture View

■Press

under real-time or freeze state to display the picture view frame .

■Press it again to close the picture view frame.

5.9.2 Cine Loop

Cine Loop

■The device can capture the current pictures into EMS memory after starting the device and entry into the scanning state. Press to begin the cine loop and the picture will be displayed circularly.

■If there is any cine file saved in the harddisk, click

in the capturing administration to play the pictures of cine file circularly.

The following scroll bar for the cone frame and delay regulation is displayed in the bottom right corner of the screen. In the scroll bar, is for delay regulation. Increase the delay value may allow to slow down the speed of cine loop

Refer to “System Settings” for frame number setting of cine loop

■ Press

twice to exit the cine loop function.

Cine Save

■Click

in the capturing administration to save the current cine in the EMS memory as a file in the harddisk.

Users can customize the saving path for cine file(Refer to 5.5 System Settings) when choosing

the cine file as [customize manually].

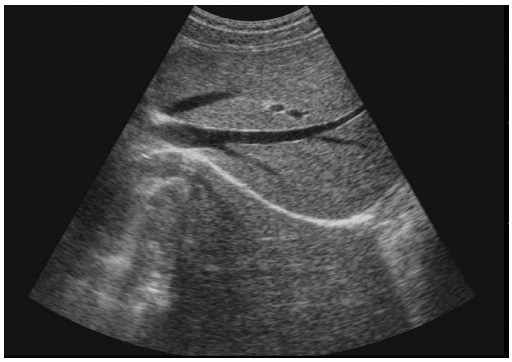
Note
Avoid performing any other task when saving the cine file into harddisk.

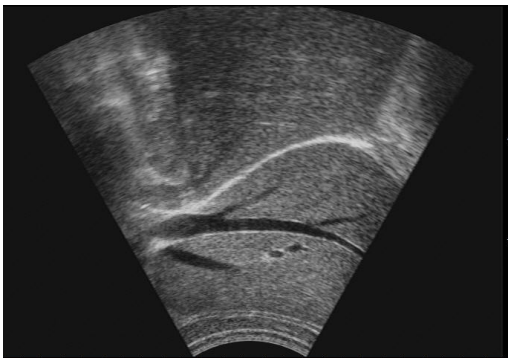
5.10 Picture Flip

5.10.1 Up and Down Flip

Press

under real-time or freeze state to flip the picture up and down.

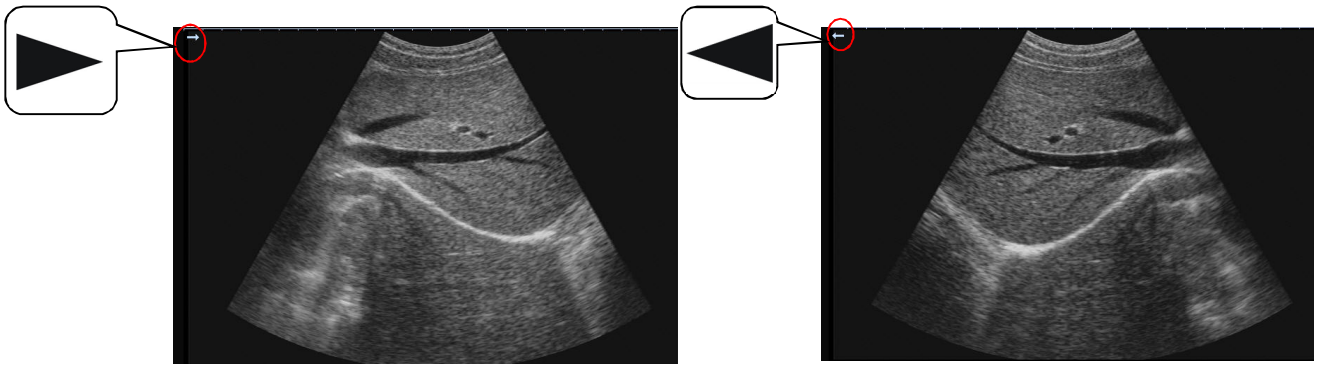




5.10.2 Left and Right Flip

Press

under the real-time state to flip the picture left and right.



Scanning direction mark of probe (in the red circle of above pictures) is picture left and right flip mark. The left picture has displayed the default scanning mode after the starting the device.

5.11 Annotation

5.11.1 Full Screen Annotation

■Press Annotation ABC to display the annotation dialogue box in the bottom tight corner of picture. After type the annotation information into the box, press Confirm in the picture display area to finish annotation.

■Press Ref. to switch input mode while making annotation.

5.11.2 Body Posture Mark Input

■Press Body under B,B/B, 4B,M and B/M modes to display the body posture mark menu. The system provides 40 body posture marks such as head, heart, obstetric, abdomen and so on. Move the cursor onto a body posture mark and click it to display the corresponding mark in the bottom right corner of picture area.

1. Abdomen

Body front (M)

Body front (F)

Body back

Body left side

Body right side

2. Obstetric

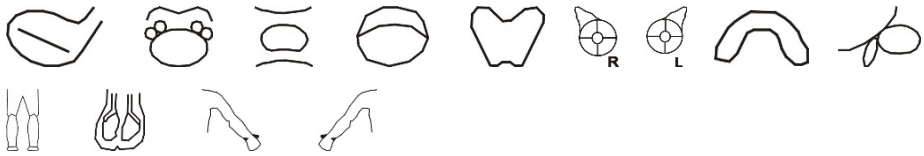
Mother (F)

Fetus

3. Head

4. Heart

5. Others



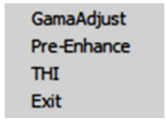
5.11.3 Indicator Input

Choose MeasureMark → ArrowMark, and press Confirm in the picture area to fix the starting point of the arrow mark . Move the trackball the control the arrow length , then press Confirm again to finish the arrow input. You can also continue input by repeating the above procedures or press Cancel to exit the indicator input.

5.11.4 Screen Clear

Press Clear to clear off the information in picture area such as measurement marks, annotation or body posture marks, etc.

5.12 Image processing

Press Image Proc key to display the image processing menu 

. It provides Gama Adjust, Pre-Enhance , THI and other image processing functions.

■select " Gama Adjust " to lighten up " Gama Adj " on the up right of the screen. There are 4 levels GM0, GM1, GM2, GM3, press to select them circularly.

■select " Pre-Enhance " to lighten up the " Enhance " on the up right screen. Then edge enhancement is adjustable. There are 9 levels: OFF, E1-E8 which can be adjusted by pressing .

■select " THI " or【MeasureMark】→

to lighten up the " THI " on the up right screen. There are 2 levels: " ON " or " OFF "

Chapter Six Measurement

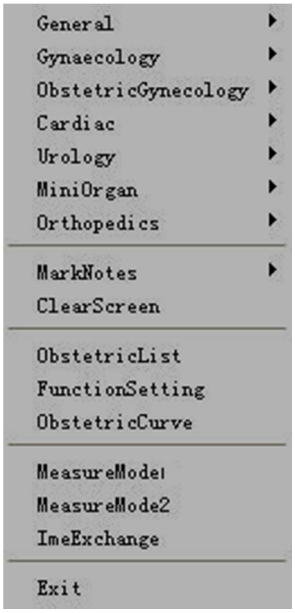
6.1 Brief Introduction

■THE DEVICE can perform different measurement items in various mode, and each item can be measured for many times. Four measurement marks are provided by this device as : ＋、×、*、#.

■The system provides 7 measurement items: General、Gynaecology、ObstetricGynecology、Cardiac、Urology、MiniOrgan、Orthopedics.

■You can enter into the measurement status via the following 2 methods in this system:

1 .Press button

to display the measurement menu 

,then select the wanted item via the cursor to perform the measurement ;

2 . Click the【Measurement Mark】, then click the wanted item via the cursor to perform the measurement.

■This device provides two measurement mode in the measurement marks menu.

MeasureMode1 : Not to save the measurement result onto the picture in the measurement item of distance, and to switch to the free measurement mode in the measurement items of area girth and volume

MeasureMode2 : Click it before measurement to save the measurement result onto the picture in the measurement item of distance , and to switch to the ellipse measurement mode in the measurement items of area girth and volume.

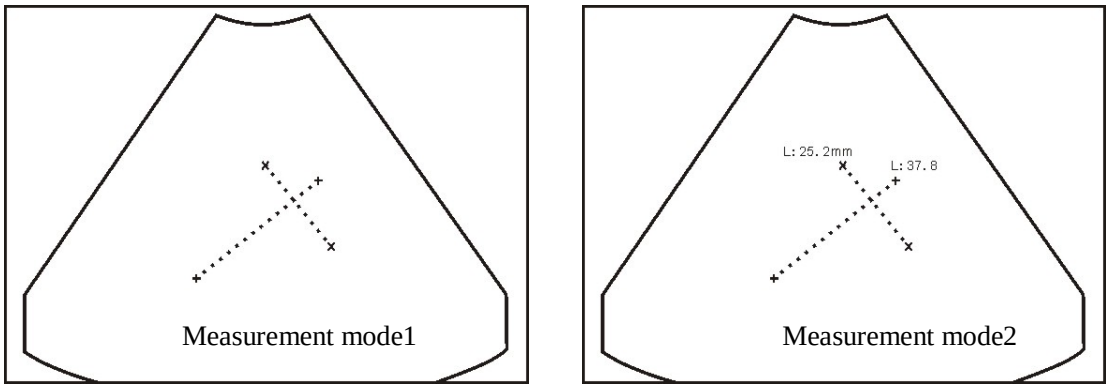
■In the process of measurement ,the current measurement item displayed in blue color on the right side of the screen. Turn the knob to change the current measurement item.

■The measurement result will be displayed in the left or right portion of the screen. You can press the button Cancel in the picture area to cancel the measurement.

6.2 Routine Measurement

6.2.1 Measurement of Length

Click to choose the starting point and ending point of the length measurement by trackball. The result value of length measurement will be displayed when release the Confirm on the ending point.



Length Measurement Sketch

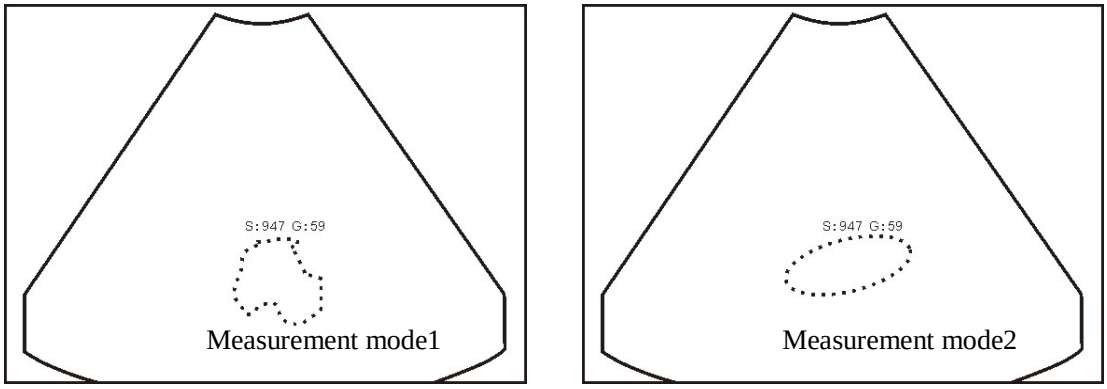
6.2.2 Measurement of Area and Girth

■Measurement Mode 1: press Confirm ,then move the cursor from the starting point to the ending point of the area for measurement. press Confirm again to close the curve

automatically. The area and girth within the curve will be displayed automatically on the right side of screen.

■Measurement Mode 2: This mode refers to the ellipse measurement method.

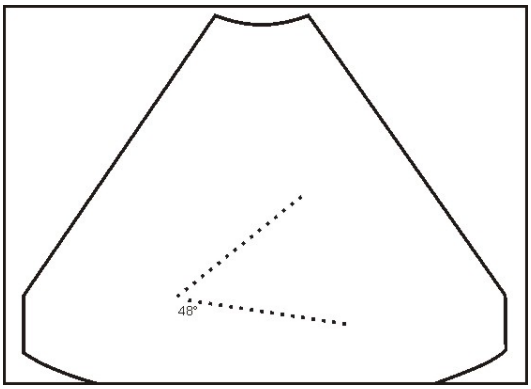
Operating Procedures: Determine the first point by pressing Confirm, move the trackball and press Confirm again to determine the second point , then move the trackball and press Confirm again to determine the size of ellipse. The measurement result will be displayed in the left portion of the screen.



Area and Girth Measurement Sketch

6.2.3 Measurement of Angle

Click at three points in the picture with the trackball, then the angle value shaped from the three points will be displayed on the right side of the screen automatically.



Angle Measurement Sketch

6.2.4 Measurement of Volume

Volume measurement is to measure the viscera as an ellipsoid or a cylinder, then calculate the volume value through the calculation method for the ellipsoid or cylinder.

Procedures (Take the kidney for example)

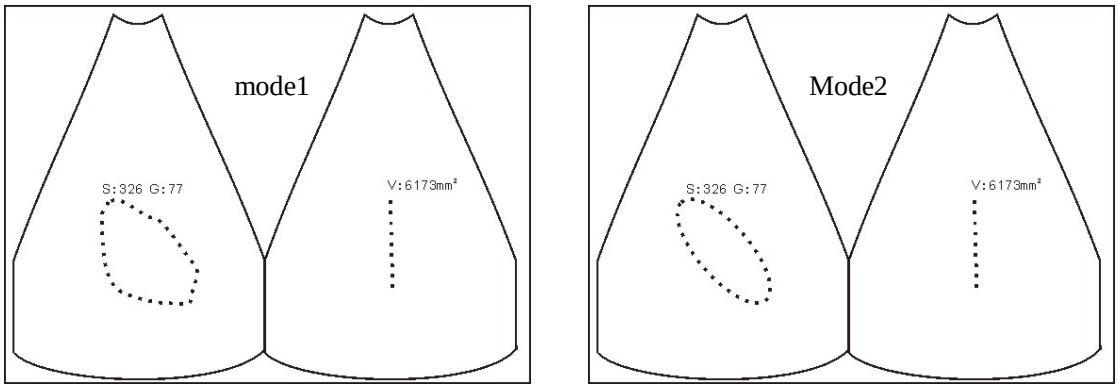
First choose the Volume, then choose MeasureMode1 or MeasureMode2

1 Select the cross section and longitudinal section pictures and freeze them respectively.

2 Measure the area of the cross section with the area girth measurement mode.

3 Measure the length of the longitudinal section with the distance measurement mode.

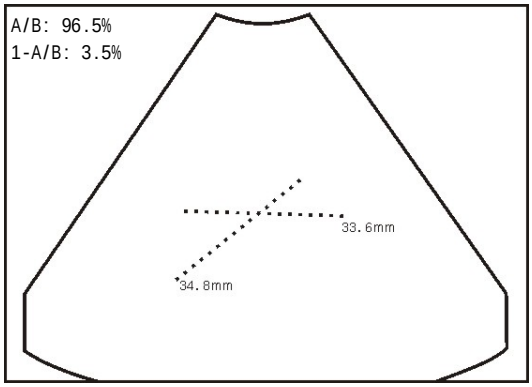
4 The measurement is finished and the measurement result is displayed on the right side of the screen automatically.



Volume Measurement Sketch

6.2.5 Measurement of Length Ratio

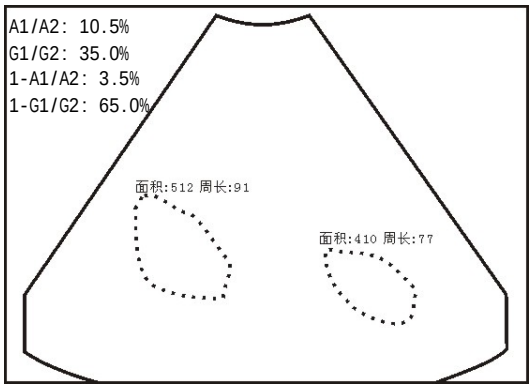
After measurement of 2 groups of length , the length ratio and length stenosis ratio will be calculated by this system automatically and will be displayed on the top left corner of the screen.

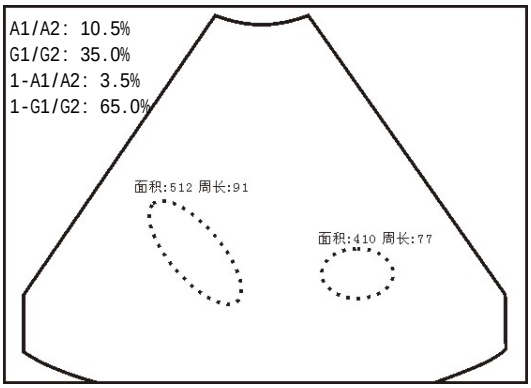


Schematic Diagram for Measurement of Length Ratio

6.2.6 Measurement of Area Perimeter Ratio

After measurement of 2 groups of area perimeter data, the area perimeter ratio and area perimeter stenosis ratio will be calculated by this system automatically, and the result will be displayed on the top left corner of the screen.



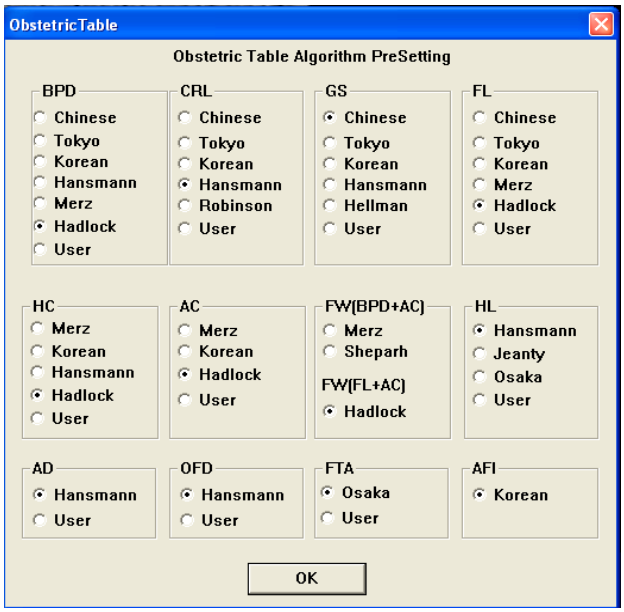


Schematic Diagram for Measurement of Area Perimeter Ratio

6.3 Obstetric Measurement

The gestational weeks can be calculated by this system based on 11 parameters such as BPD , CRL, GS , FL , HC and AC. The fetal weight can be calculated based on the AC. The algorithm prior to measurement can be preset by press

key , Choose【Algorithm Presetting】to display the following menu:



Users can choose the appropriate algorithm based on the practical needs . Click OK to confirm the presetting .

The system provides multi-functional calculation for gestational weeks ,and the available parameters for calculation are listed as follows:

Obstetric Measurement Items	Measurement Parameters
BPD	Distance
CRL	Distance
GS	Distance
FL	Distance
HC	Circumference
AC	Circumference
AD	Distance
OFD	Distance
HL	Distance
FTA	Area
AFI	4 Distance

■BPD, CRL, GS, FL, AD, OFD, HL: Press the corresponding command icon first, then press Confirm on the picture to choose the stating point and ending point for measurement with the trackball. Release the Confirm at the ending point to display the result of above obstetric

measurement items.

■HC: press

, then move the trackball to form a ellipse. press

again after determining the ellipse size to finish the measurement. The HC and gestational weeks will be displayed on the right side of the screen automatically.

■ AC/FW: Principle: Treat the cross section of abdomen as an ellipse , and measure the circumference (AC) with the ellipse measurement method.

The measurement procedures are the same as HC , and the AC, gestational weeks and fetus weight will be displayed on the right side of the screen automatically.

■AFI:

The AFI is calculated by adding the maximum perpendicular distances of amniotic silent gone which are measured from the four angles of parturient abdomen.(The normal range of AFI is 8-18cm)

1、Acquire the freeze image of amniotic fluid from the first angle;

2、Measure the maximum perpendicular distance of amniotic fluid at the first angle with the distance measurement method;

3、Move the cursor to another angle of amniotic fluid to perform the next measurement according to the step 2;

4、Perform the measurement for four values with the above method ,and the measurement result will be displayed in the obstetric measurement information area in the right portion of the screen(Unit:mm)

■Trunk Cross-Sectional Area

Please refer to the measurement of perimeter area for the measurement method, and the trunk area & gestational age will be displayed in the right portion of the screen automatically

after measurement.

6.4 Heart Measurement

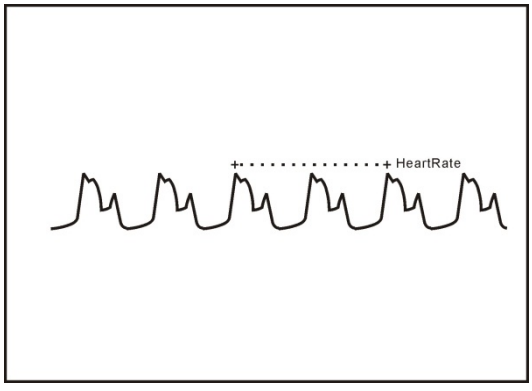
6.4.1 Basic Measurement

■Distance：Click it to take the measurement of heart parameter under the BM/M mode. press Confirm to choose the starting point and ending point for measurement on the picture with the trackball. The measured result for distance value will be displayed on the screen when releasing the Confirm.

■Time： press Confirm to choose two wave crest points of the cardiac cycle on the picture with the trackball. The measured result for time will be displayed on the screen when releasing the Confirm.

■Slop： press Confirm to choose the starting point and ending point for measurement on the picture with the trackball. The measured result for slope will be displayed on the screen when releasing the Confirm.

■HeartRate： press Confirm to choose two wave crest points of the cardiac circle on the picture with the trackball(To enhance the precision of measurement ,the device is preset to take the measurement for two cardiac circle)The measured result for heart rate will be displayed one the screen when releasing the Confirm.



Heart Measurement Sketch

6.4.2 Aortic Valve Measurement

In the image of B Mode , the diameter of aortic valve, the size of aortic orifice ,the ratio between aorta and left atrium are calculated for aortic valve measurement. The detailed operations are as follows:

1、Enter into the B/M Mode, then adjust the position of the sampling line through moving the trackball. Press the

button when the proper M Mode image appears;

2、Choose 【Aortic Valve】 and move the cursor to the image area to press

, then a vertical time line will be displayed in the M Mode image;

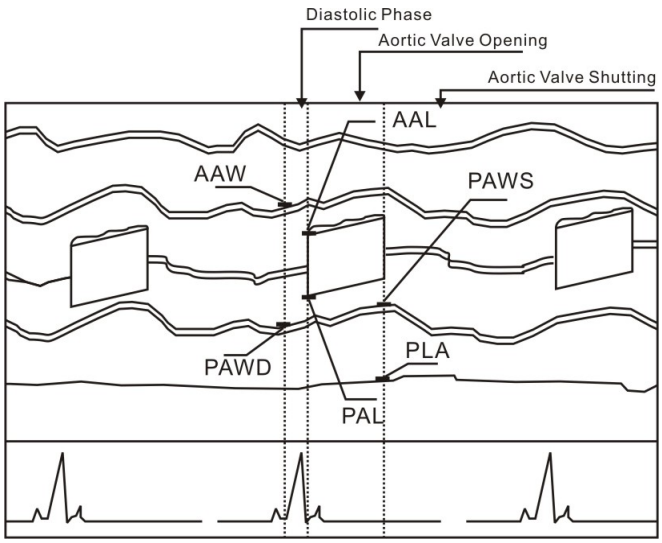
3、Move the time line to the diastolic phase by the trackball ,and mark the anterior aortic wall(AAW) and the posterior aortic wall (PAWD) through pressing

. The [AO] value will be displayed in the information bar after marking;

4、Move the time line to the opening point of the aortic valve by the trackball, and mark the anterior aortic lobule (AAL) and the posterior aortic lobule (PAL) with the above mentioned method. The [AVO] value will be displayed in the information bar after marking.

5、Move the time line to the shutting point of the aortic valve by the trackball ,and mark the posterior aortic wall (PAW) and the posterior lobular arterial wall(PLA) with the above mentioned method .The [LA] value will be displayed in the information bar after marking.

6、After all the measurement are performed , the calculated result for aortic valve will be will be displayed at the top left corner of the screen.



Measurement for Aortic Valve

AO—— Diameter of aortic root at the end of diastolic phase (mm)

LA—— Diameter of left atrium at the end of diastolic phase (mm)

AVO—— The distance between the anterior aortic lobule and the posterior lobule at the opening point of the aortic valve(mm).

LAR—— The ratio of left atrium/aorta

LVET—— Left ventricular ejection time(ms)

6.4.3 Left Ventricle Measurement

■Measure the following parameters in the diastolic and systolic phase :

Diameter of left and right ventricle;

Thickness of right ventricular wall, left ventricular posterior wall and left ventricular septum.

To calculate respectively:

Stroke volume, stroke index, electrocardio-output , electrocardio-index, systolic fraction, ejection fraction, left ventricular perimeter.

■Operating Procedures:

1、Enter into the B/M Mode ,then adjust the position of the sampling line through moving the trackball. Press

button when the proper M Mode image appears;

2、Measure the heart rate (The heart rate must be measured prior to the measurement of this item);

3 、Choose【Left Ventricle】 and move the cursor to the image area to press

,then a vertical time line will be displayed on the M Mode image;

4、Move the time line to the ending of the diastole phase by the trackball, and mark the right ventricular anterior wall of the diastolic phase by pressing

. Some points to mark in the diastolic phase are listed as follows, and please mark them with the above mentioned method:

PRHWS—— Posterior right ventricular wall in the diastolic phase

AIVSD—— Anterior ventricular septum wall in the diastolic phase

PIVSD—— Posterior ventricular septum wall in the diastolic phase

ENDOD—— Endocardium of the posterior ventricular wall in the diastolic phase

EPID—— Epicardium in the diastolic phase

5、A second time line will be displayed after EPID marking . Move the time line to the ending point of the systolic phase by the trackball,and mark the anterior right ventricular wall by pressing

. Some points to mark in the systolic phase are listed as follows ,and please mark them with the above mentioned method:

PRHWS—— Posterior right ventricular wall in the systolic phase

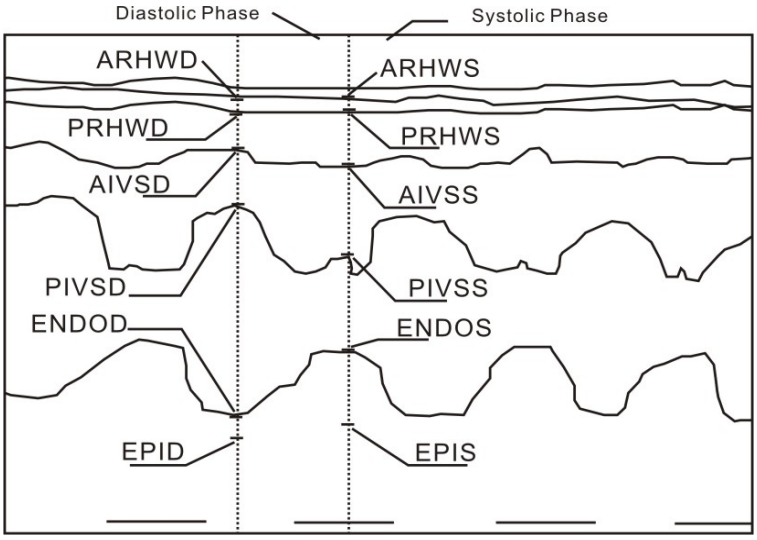
AIVSS—— Anterior ventricular septum wall in the systolic phase

PIVSS—— Posterior ventricular septum wall in the systolic phase

ENDOS—— Endocardium of posterior ventricular wall in the systolic phase

EPIS——Epicardium in the systolic phase

6、The measurement result will be displayed automatically at the bottom left corner of the screen.



Measurement for left ventricle

LVEDV— Left ventricular volume at the end of diastolic phase (mL)

RHWD—Thickness of right ventricular wall in the diastolic phase (mm)

LVESV— Left ventricular volume at the end of systolic phase (mL)

RHWS—Thickness of right ventricular wall in the systolic phase (mm)

SV—Stroke volume (mL)

RVD— Diameter of right ventricle in the diastolic phase (mm)

SI— Stroke index (mL/m2)

RVS— Diameter of right ventricle in the systolic phase (mm)

CO— Electrocardio-output (L/M)

LVDD— Diameter of left ventricle in the systolic phase (mm)

CI—Electrocardio-index (L/M/m2)

LVDS—Diameter of left ventricle in the systolic phase (mm)

SF—Systolic fraction (%)

PLVWD—Thickness of posterior left ventricular wall in the diastolic phase (mm)

EF—Ejection fraction (%)

PLVWS—Thickness o posterior left ventricular wall in the systolic phase (mm)

LVC—Left ventricular perimeter (mm/S)

IVSD—Thickness of ventricular septum in the diastolic phase (mm)

IVSS—Thickness of ventricular septum in the systolic phase (mm)

6.4.4 Bicuspid Measurement

■Users can estimate the D-E excurion ,D-E and E-F slope rate based on the D wave, E wave and F wave under the M mode and the BM mode for bicuspid measurement.

■Operating Procedures:

1、Enter into the B/M mode, and adjust the position of the sampling line by moving the trackball .Press the

button when the proper M mode image appears.

2、Choose【Bicuspid】, then move the cursor to the Q wave position of M mode in the image area and press

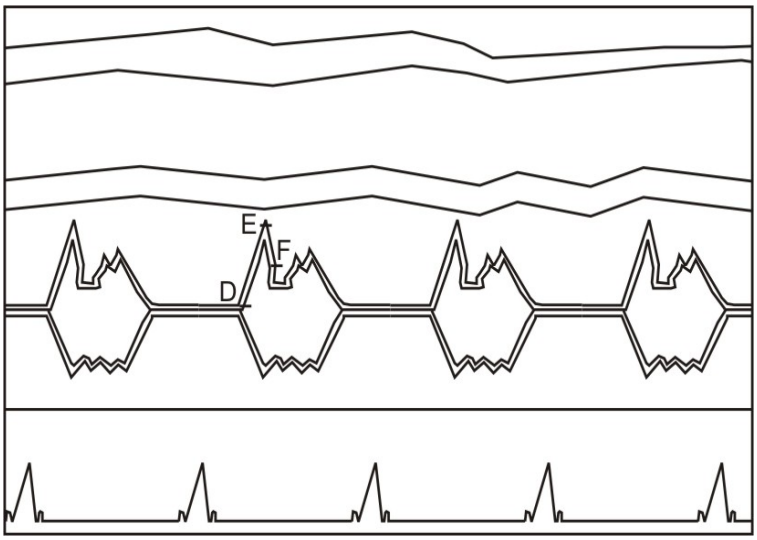
to mark “ D ”;

3、Mark the following bicuspid wave with the above mentioned method:

E : E wave

F : F wave

4、After marking ,the measurement result will be displayed automatically at the top right corner of the screen。



Measurement for bicuspid

DEex—Excursion (mm)

DEsl—Slope Rate (mm/S)

EFsl—Slope Rate (mm/S)

6.4.5 Pulmonary Valve Measurement

■This is a characteristic calculating parameter in the bicuspid measurement. Perform the calculation for pulmonary valve based on the following marking points:

A： Maximum downward position of valve in the atrial systolic phase

B： Starting point of the ventricular systolic phase

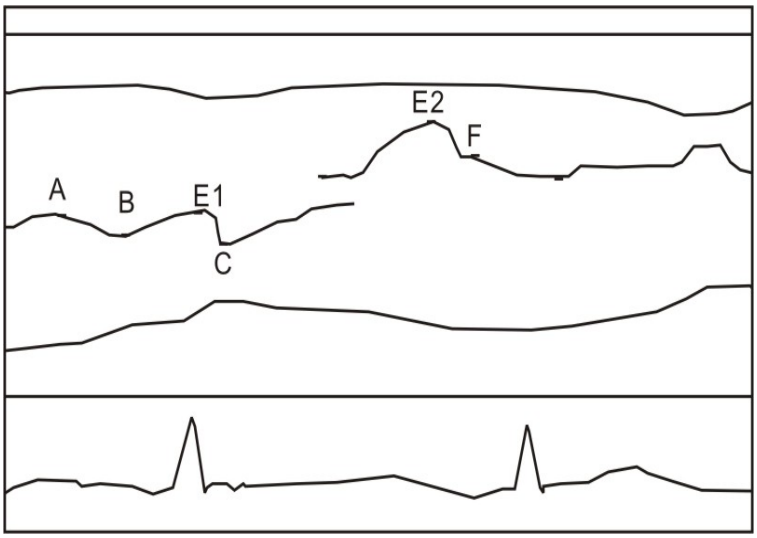
C： Maximum opening point of the lobule

E1： Starting point of ventricular diastolic phase

E2：Completely shutting point of valve

F： Starting point of atrial systolic phase

■ Mark the above points with the method mentioned previously. After marking, the measurement result will be displayed automatically at the bottom right corner of the screen.



Measurement for pulmonary valve

FAF——Depth

The distance from F to A refers to the distance from the starting point of the atrial systolic phase to the maximum downward position of the pulmonary valve .The distance of F to A on the Y axis indicates the maximum movement range of the pulmonary valve in the atrial systolic phase.

FAF=AY-FY (mm)

AY refers to the point A on the Y axis, while FY refers to the point F on the Y axis.

FEFsl——Slope Rate

When the blood begins to flow out from the atrium ,E1 refers to the starting point of the ventricular diastolic phase, while F refers to the inflow starting point of atrial systolic phase.

FEFsl= (FY-E1Y) /(FX-E1X)(mm)

FY refers to the point F on the Y axis, E1Y refers to the point E1 on the Y axis, FX refers to the point F on the X axis, and E1X refers to the point E1 on the X axis.

FBC——Diameter

FBC refers to the opening point of the pulmonary valve in the ventricular systolic phase ,and the portion on the Y axis indicates the movement distance of the lobule when the opening of pulmonary valve reaches maximum .

FBC=CY-BY(mm)

CY refers to the point C on the Y axis , while BY refers to the point B on the Y axis.

FBCsl——Slope Rate

FBCsl=(CY-BY)/(CX-BX) (mm/S)

CY refers to point C on the Y axis, BY refers to point B on the Y axis, CX refers to point C on the X axis, while BX refers to point B on the X axis.

FRVET——Ejection Time of Right Ventricle

The ejection time of right ventricle refers to the time from point B to point E2 when the pulmonary valve opens.

RVET=E2-BX (S)

E2 refers to point E2 on the X axis, while BX refers to point B on the X axis

6.4.6 Tricuspid Measurement

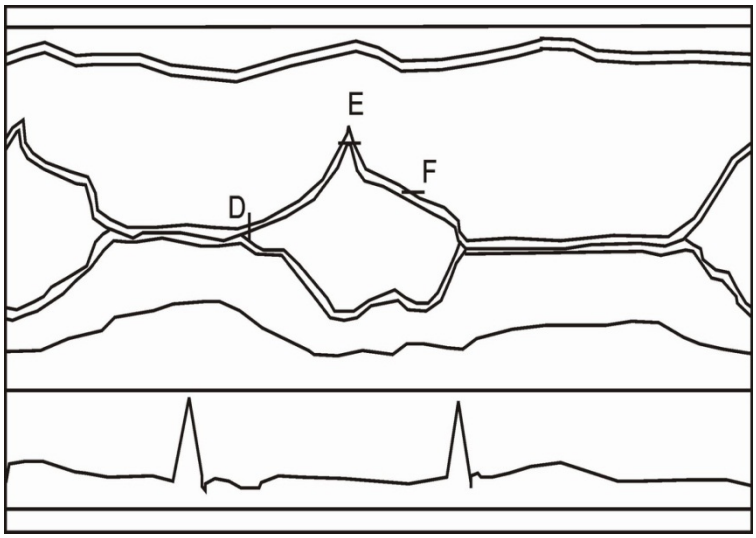
■The measurement of tricuspid is similar to the measurement of bicuspid, and the following three points will be involved for measurement of tricuspid:

D: Tricuspid opening point , the end of right ventricular systolic phase

E : Maximum opening point of tricuspid

F: Completely shutting point of tricuspid

■ Mark the above points with the method mentioned previously. After marking, the measurement result will be displayed automatically in the top right corner of the screen.



Measurement for tricuspid

DE Excursion:

Tricuspid excursion distance , the distance from point D(right ventricle prior to tricuspid opening) to point E(Maximum opening point of tricuspid) on the Y asis.

DE=(Point D on Y axis –Point E on Y axis)/11(mm)

EF Slope Rate:

Slope rate from point E(Tricuspid opens completely and the blood begins to flow in) to point F(Tricuspid closes completely temporarily ,and the blood inflow ends)

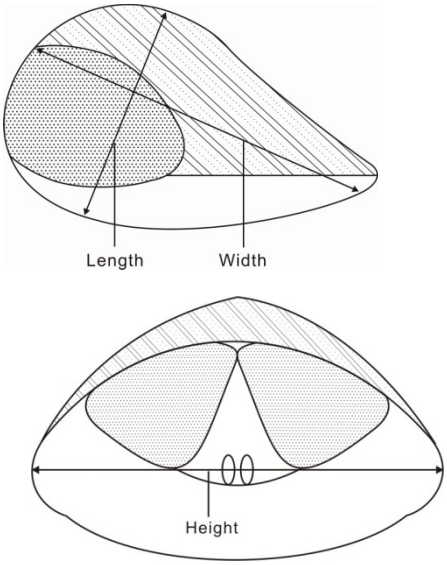
EF= (point F on Y axis-Point Eon Y axis) /(Point F on X axis –Point E on X axis)(mm/s)

6.5 Uropoietic Measurement

6.5.1 Prostate Volume

■ The measurement function of prostate volume can be used for measuring the volume of prostate and estimating the prostate specific antigen.

<Measurement Site>



<Measurement Result>

Height	Height of prostate (mm)
Length	Length of prostate (mm)
Width	Width of prostate (mm)
Volume	Volume of prostate (mm)
Pred.PSA	Estimated prostate specific antigen based on prostate volume (ng)
PSA Dens.	Density of prostate specific antigen

■Equation for calculation:

Volume=Length×Width×Height×0.000523

PSA Dens.=PSA/V

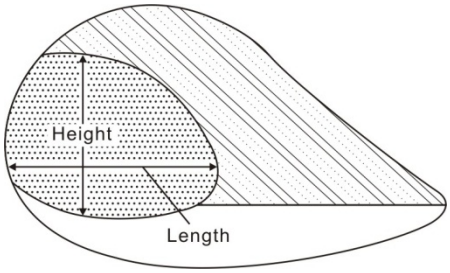
■Measurement method:

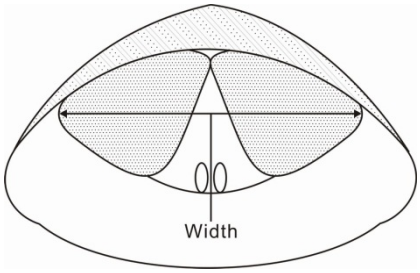
Choose【Prostate Volume】, then PSA value will be required to be inputted .Click OK to confirm after inputting.

Measure the length, width and height of the prostate at the appropriate measurement sites, then the system will calculate the prostate volume (Volume) automatically ,estimated prostate specific antigen based on the prostate volume (Pred.PSA) ,and the prostate specific antigen density (PSA Dens.) .

6.5.2 Volume of Transitional Zone

<Measurement Site>





<Measurement Result>

Height	Height of transitional Zone mm
Length	Length of transitional zone mm
Width	Width of transitional Zone mm
Volume	Volume of transitional Zone cm3
TZPSA	Prostate specific antigen of transitional zone ng

■Equation for calculation:

Volume=Length×Width×Height×0.000523

TZPSA= Length×Width×Height×0.000084

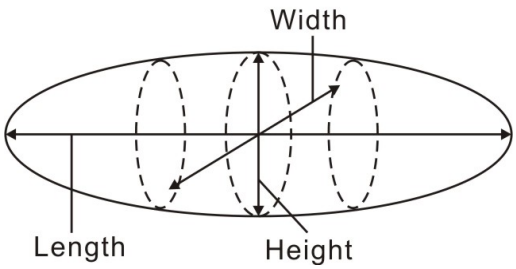
■ Method for Measurement:

Measure the length, width and height of the transitional zone at the appropriate measurement sites , then the system will calculate the volume of transitional zone(Volume) and the prostate specific antigen of the transitional zone(TZPSA).

6.5.3 Bladder Volume

<Measurement Site>

<Measurement Result>



Height	mm	Height of bladder
Length	mm	Length of bladder
Width	mm	Width of bladder
Volume	cm^3	Volume of bladder

■Equation for calculation :

Volume=Length×Width×Height×0.000523

■Method for measurement :

Measure the length ,height and width of transitional zone at the appropriate measurement sites ,then the system will calculate the bladder volume (Volume) automatically.

6.5.4 Residual Urine Volume

■Measurement site: The residual urine volume area in the bladder.

■The result and equation for measurement are similar to the bladder measurement.

■Measurement Method:

Measure the length, height and width of the residual urine volume area on a bladder picture, then the system will calculate the residual urine volume(Volume) automatically.

6.5.5 Measurement of Left & Right Renal Volume

Please refer to the measurement of bladder for the detailed measurement method.

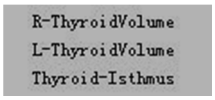
6.6 Gynecologic Measurement

There are 13 measurement items in the gynecologic measurement

, Among

these, you can refer to the distance measurement for the measurement method of endometrium thickness, while refer to the [6.5.1 Prostate Volume] for the measurement method of the other items. The measurement result will be displayed in the left portion of the screen after measurement.

6.7 Measurement of Organellae

The organellae measurement includes 3 measurement items 

, Among them, please refer to [6.5.1 Prostate Volume] for the measurement method of volume of right lobe of thyroid gland as well as the left lobe, while refer to distance measurement for the measurement method of the thickness of isthmus glandulae thyreoideae. When the volume measurement of right & left lobe of thyroid gland is finished, the system will calculate the volume of thyroid gland automatically and displayed the result at the top left corner of the screen.

6.8 Orthopedic Measurement

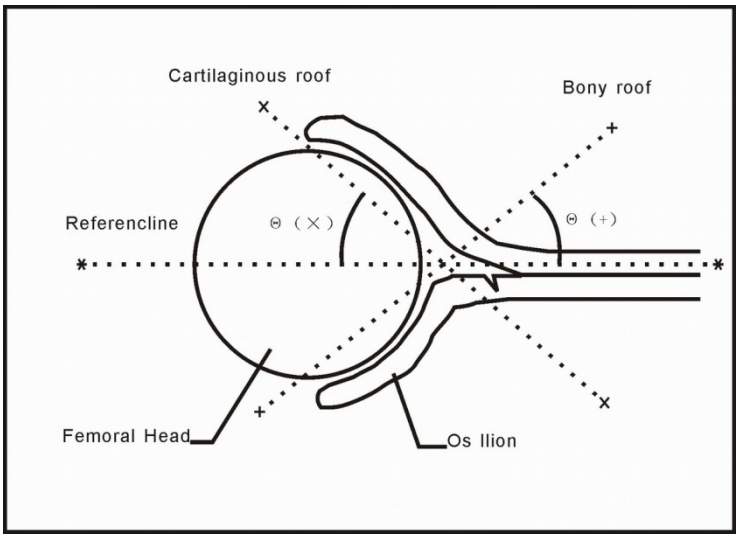
■The orthopedic measurement includes two items of right &left hip joint.

■Under the B and B/B Modes, this function is for calculating the hip joint angle and diagnosing the fetal growth and development condition. The detailed operation procedure is as follows ;

1．Fix the reference line;

2．Determine the bone top line to calculate the angle value of θ (+) ;

3．Determine the cartilage top line to calculate out the angle value ofθ (×)



Measurement of Hip Joint

6.9 Operating Instruction for Function of Puncture Guide

Warning

The puncture guiding line must be calibrated before performing a new puncture .If the puncture needle is not consistent with the puncture guiding line , please do not perform the puncture operation.

Warning:

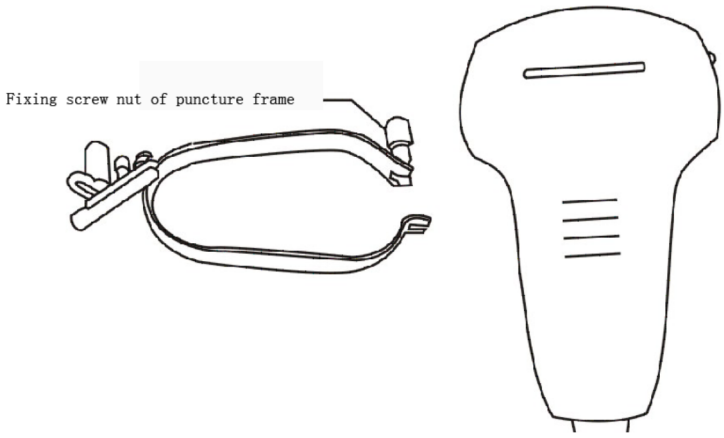
It is with risk when performing the puncture guided under ultrasound, thus it should be operated by operators with the proper qualification and capability ,and the preparative work before operation such as examination of clotting time ,BPC,electrocardiogram, blood pressure, sterilization of puncture set and puncture probe and signing of operation agreement should be done strictly.

Note:

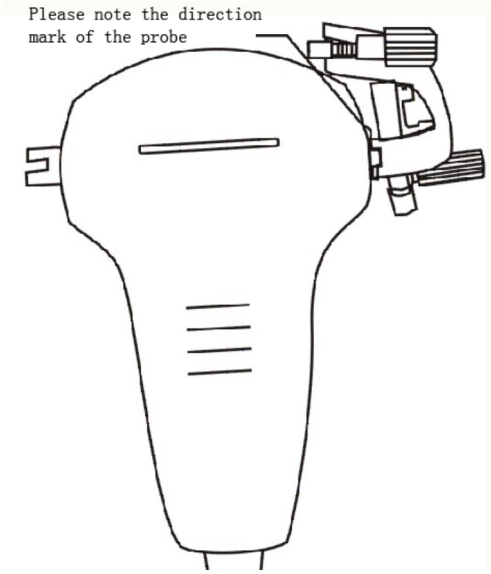
The puncture operation should be performed under the real-time status.

6.9.1 Fixation of Puncture Frame and Probe

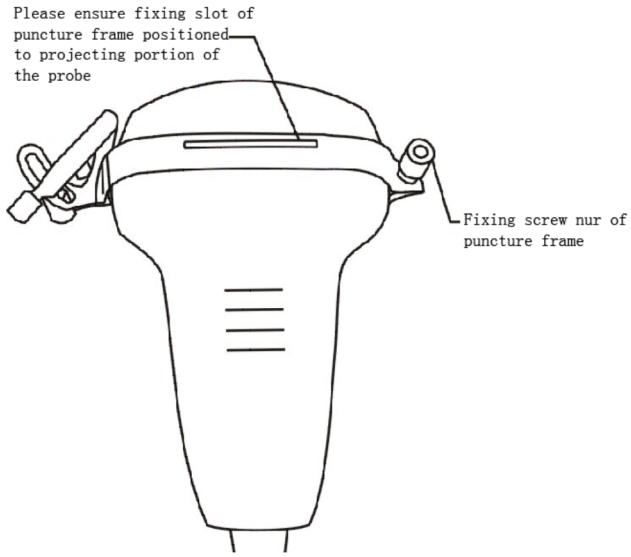
1) Put the probe aside, then loosen the fixing screw nut on the puncture frame.



2) Mount the puncture frame on the probe.

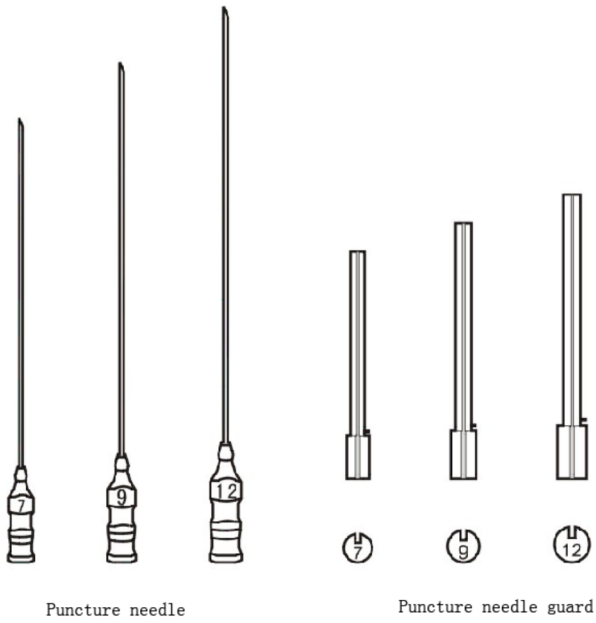


3) Buckle on the puncture frame and turn over the probe , then fasten the fixing screw nut of the puncture frame.


Please ensure fixing slot of puncture frame positioned to projecting portion of the probe
Fixing screw nur of puncture frame

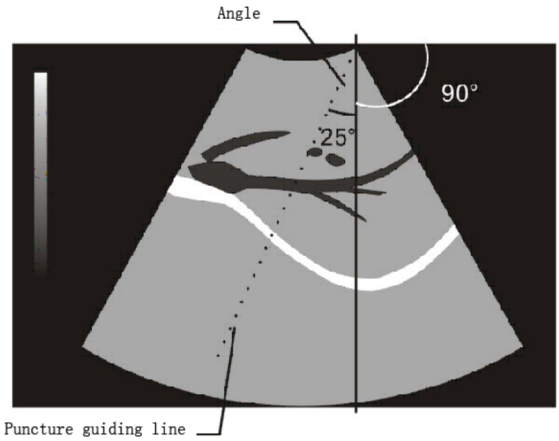
6.9.2 Selection of Puncture Needles

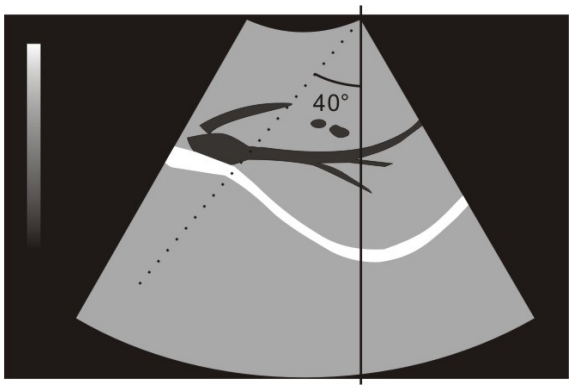
The puncture needles can be divided into 3 specification numbers such as No.7, No.9 and No.12. You can choose the proper puncture needle and needle guard based on the practical need. Please ensure that the specification number of selected puncture needle should be consistent with the selected needle guard.

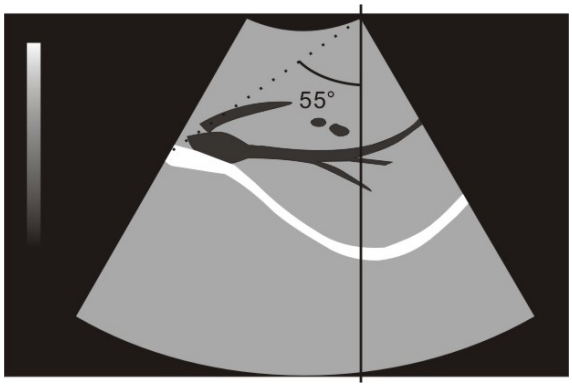


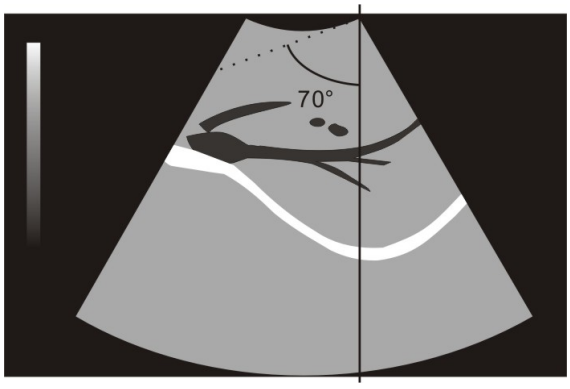
6.9.3 Call out the Puncture Guding Line

press Confirm 【MeasureMark】→ AmnionPunc to call out the puncture guiding line by the cursor underthe real-time status of the single B mode. There are 4 types of puncture guiding line angle (25°、40°、55°、70°)for adjustment, and you can press Confirm repeatedly to switch between the different angles or exit the guiding line. You can calibrate the puncture line by movng the cursor slightly in the picture area.





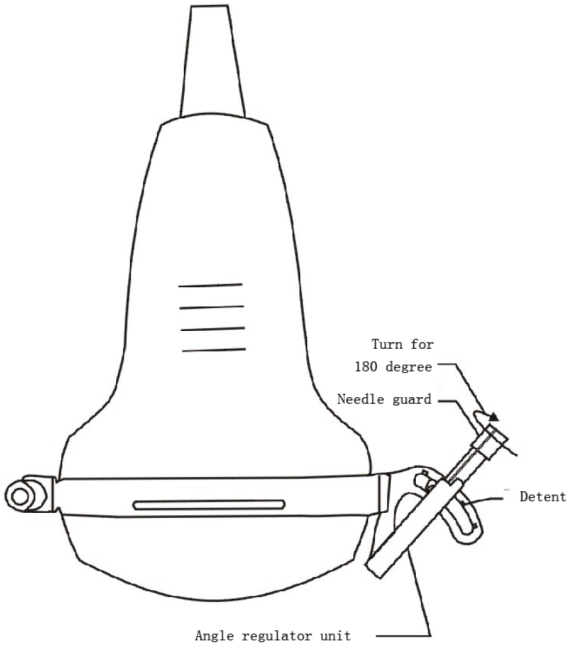




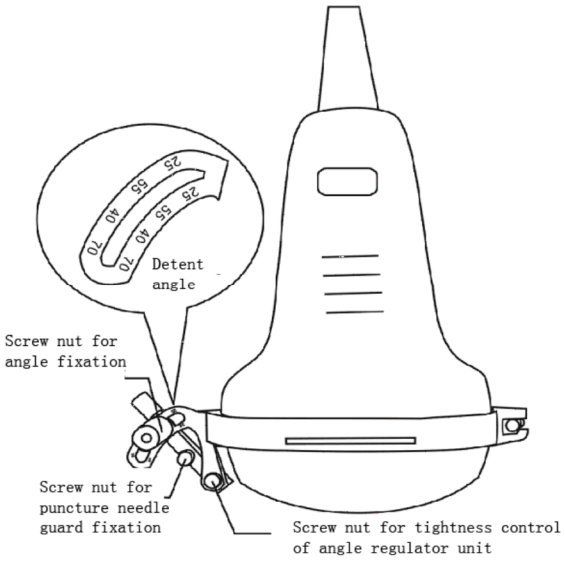
6.9.4 Calibration of Puncture Line

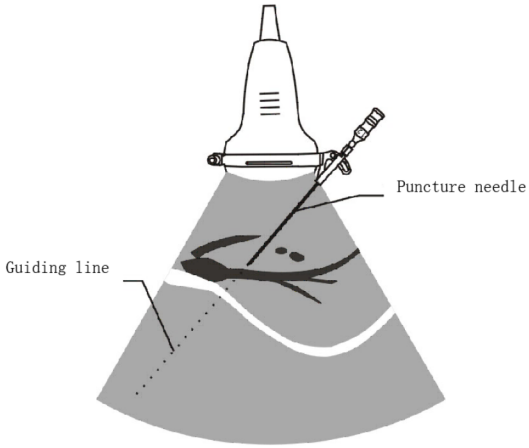
1) Fix the selected puncture needle on the angle regulator unit, then turn the puncture needle guard in ward for 180 degree. Thus the puncture angle can be adjusted by the angle regulator

unit on the puncture frame.



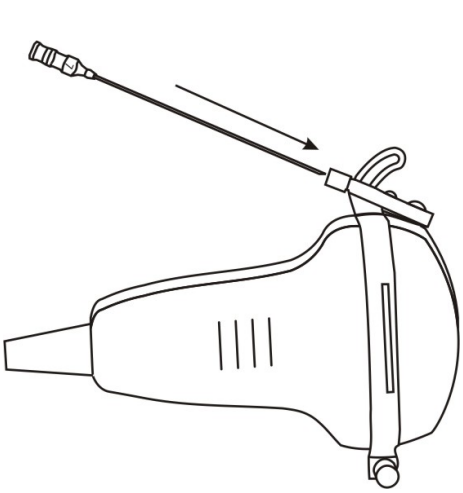
2) Please ensure that each type of angle should be identical with the detent (Detent Angle: 25°、40°、55°、70°). The puncture needle angle should also be identical with the angle of puncture guiding line.

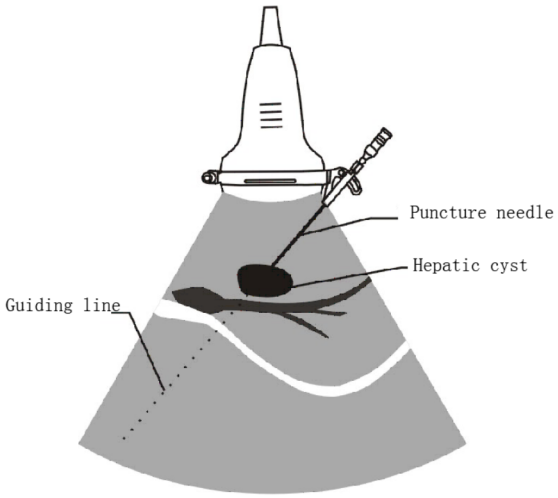




6.9.5 Insertion of Puncture Needle

1) Please ensure that the tissue for puncture is on the puncture guiding line first. Then adjust the angle and insert the puncture needle slowly in the direction of needle guard

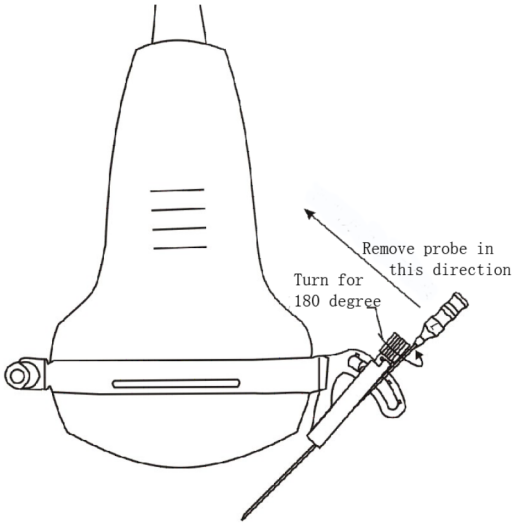




2) Please do not move the probe when inserting the puncture needle for ensuring the accuracy of the puncture operation.

6.9.6 After Puncture

1) Turn the puncture needle guard outward for 180 degree to make the rabbet of the puncture needle guard outward ,then remove the probe from it.

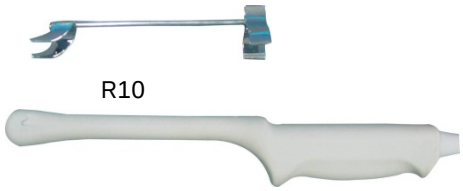


2) press

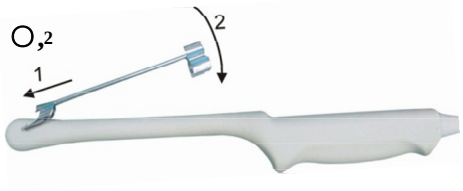
continuously to exit the puncture guiding line.

Tips: brief statement about installing the puncture frame on the probe (R10)

O,1 puncture frame



O,2



O,3

O,4 insert the puncture needle along this direction

6.10 Brief Description of Drawer Menu

■Move the cursor to the right side of the screen by moving the trackball, then click to choose the specific function .

■The drawer menu includes four parts as SysControl、SysManage、ImageProcess、MeasureMark.

■ The hidden options in the drawer menu will be displayed when clicking

■All the options can be done by using the drawer menu.

■ The shortcut menu will be displayed when moving the cursor

■ to the left side of the drawer menu and pressing Cancel.

Reset Click it to reset all parameters as the default value.

Exit Shut down the main unit and make the device turn to be under the stand-by state while the power indicator light will turn to be orange. Process Click it to display or hide the image processing dialogue box to regulate the display conditions.

Magnify1 Its function is the same as Zoom.

4XWindow Its function is the same as .

Its function is the same as

.

Its function is the same as

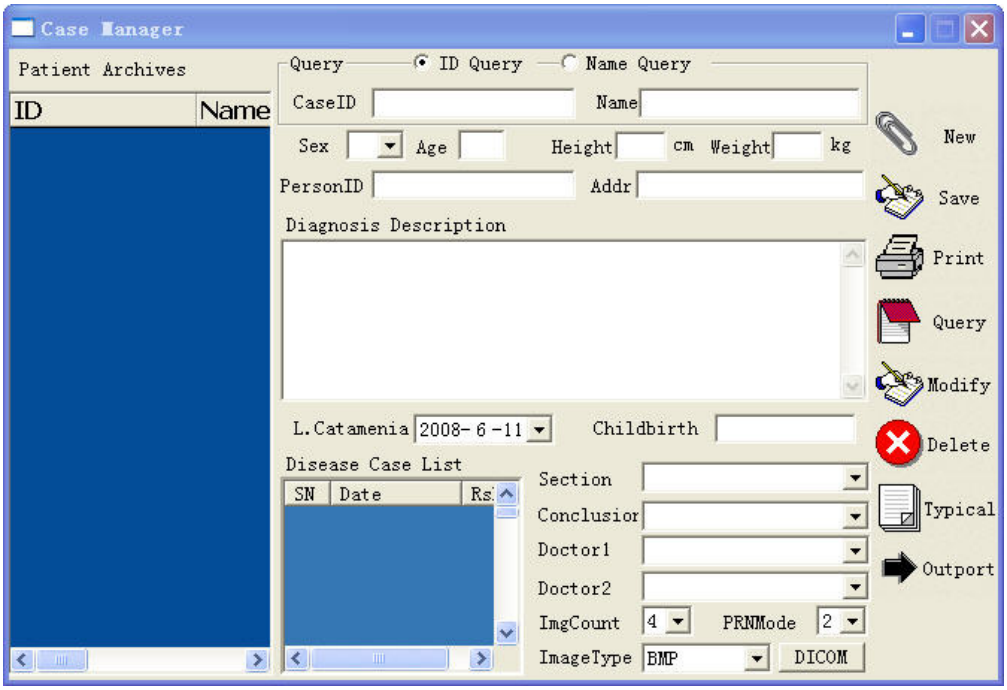
.

: Click it to switch the display bar of parameter information to display the B-ultrasound control parameters or measurement parameters.

Chapter Seven Case Administration

7.1 Enter The Case Administration

Press the button NEW-P to enter into the interface of case administration, and the captured pictures are loaded and displayed bellow. Now you can create ,save ,print ,query, modify, delete and export the case.



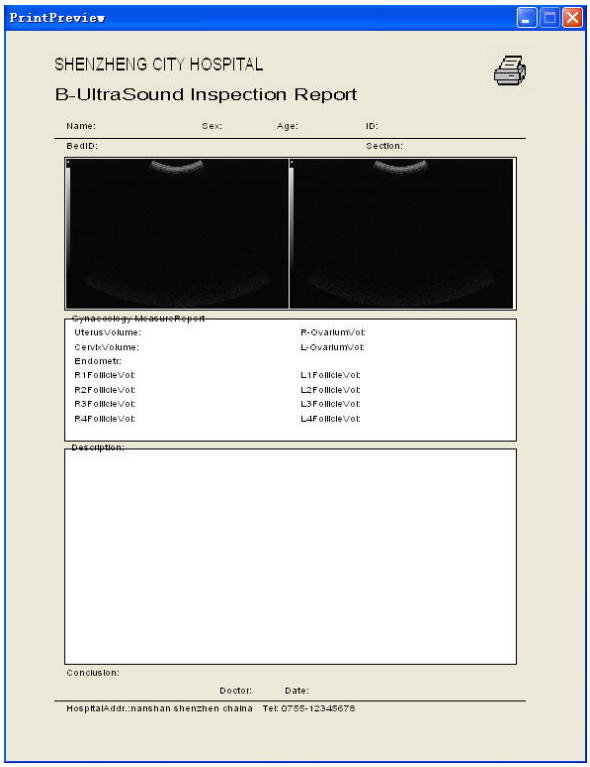
7.2 Introduction for Shortcut Buttons

New : Click it to create the new case number in the automatic order. Input the name , sex and age , then click OK to create a new case.

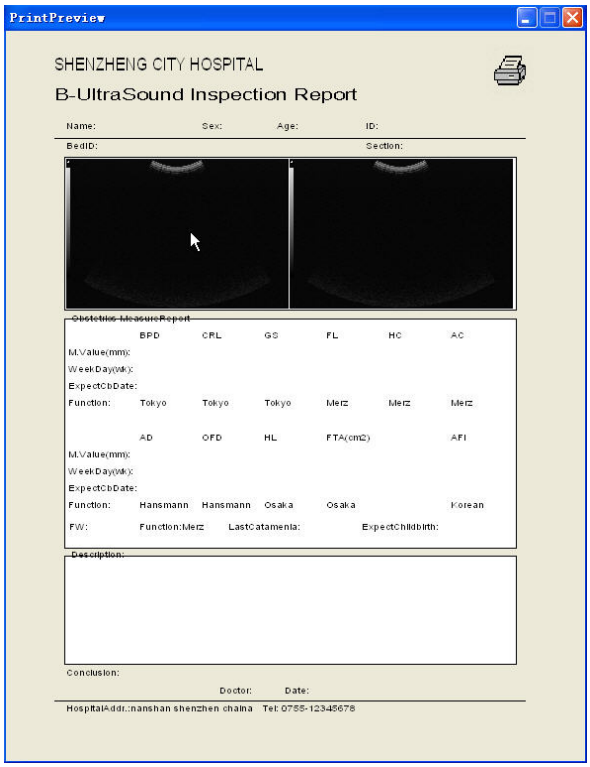
Save : Click it to save the current graphic and text case into the database, while it will be added and displayed in the case list.

Print : Printout the currently selected case . Choose PRNMode 1 to printout a large picture together with the text report, while choose PRNMode 2 to printout 2small pictures together with the text report, and choose PRNMode 4 to printout 4 small pictures together

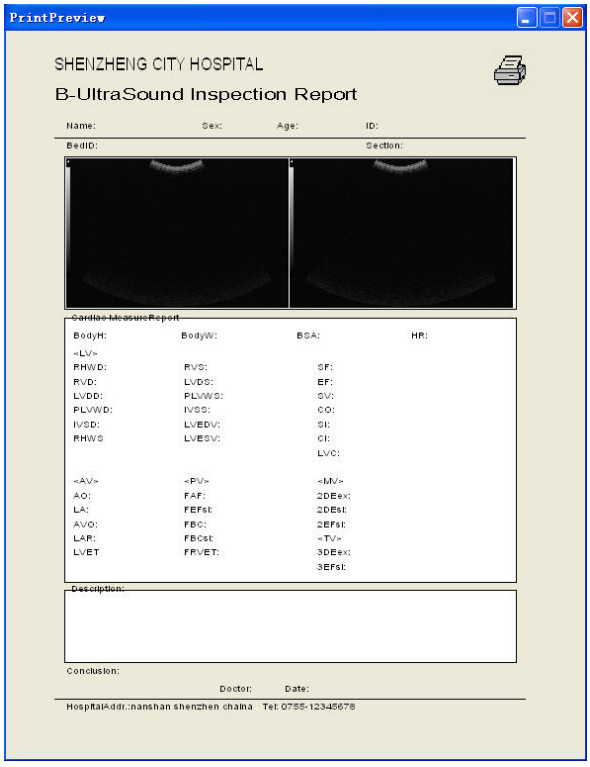
with the text report.

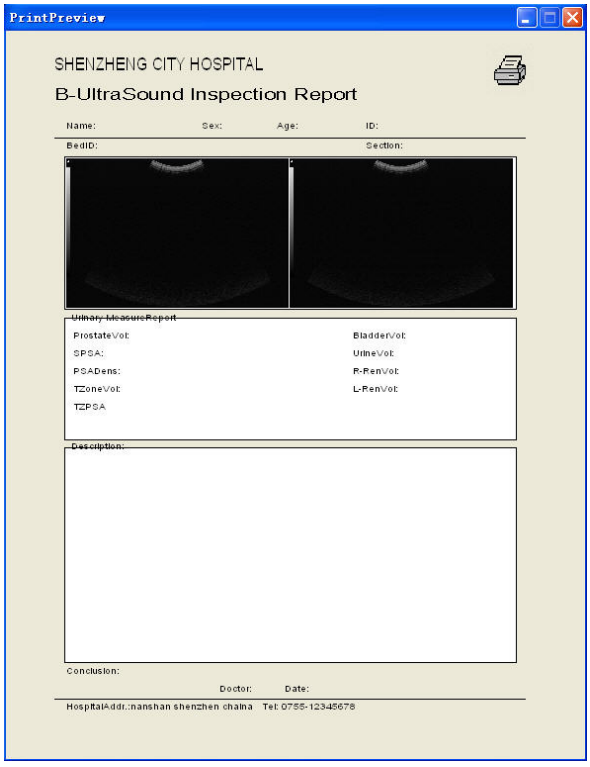


Gynaecology

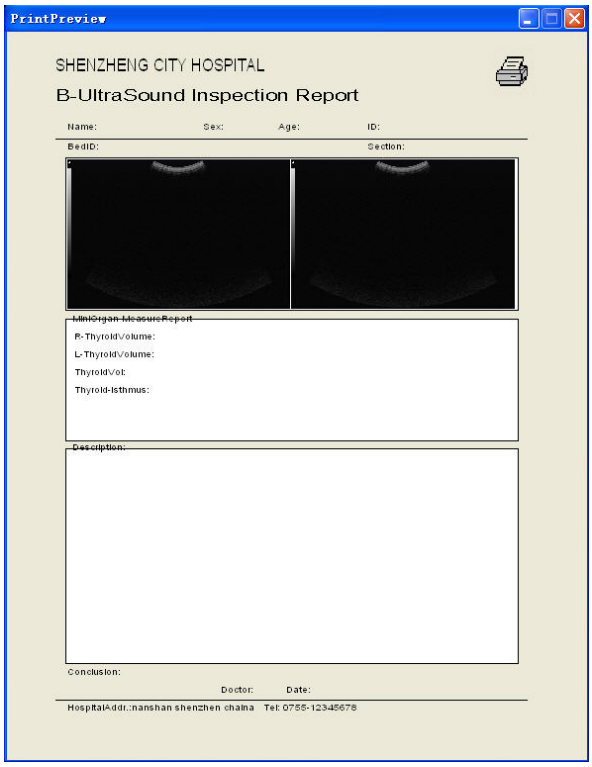


Obstetrics

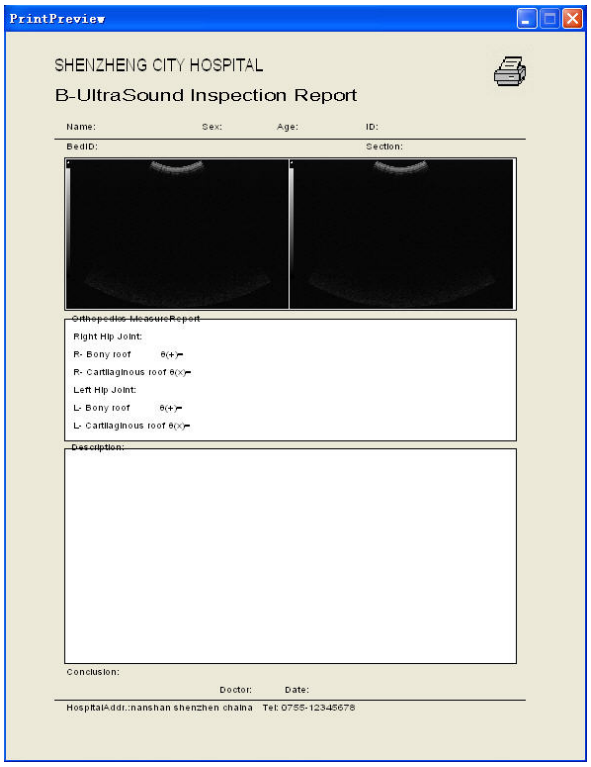




Cardiac

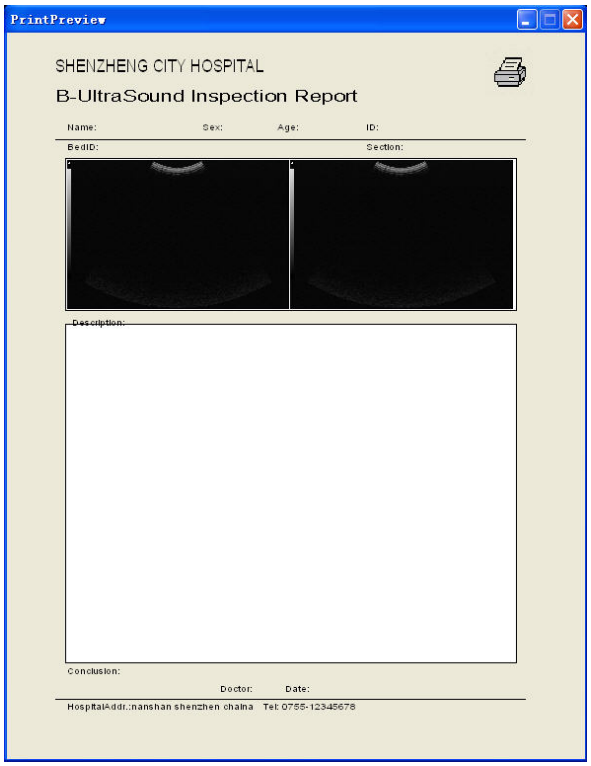


Urinary



MiniOrgan

Orthopedics



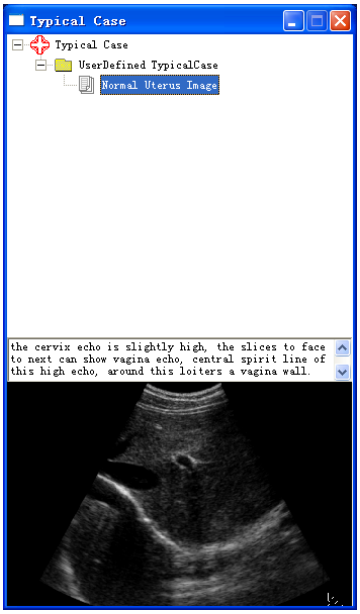
Abdomen

Query : Click it after choosing the query mode in Query ID Query Name Query to query the data and display it in the case list.

Modify : Click it to modify the current case.

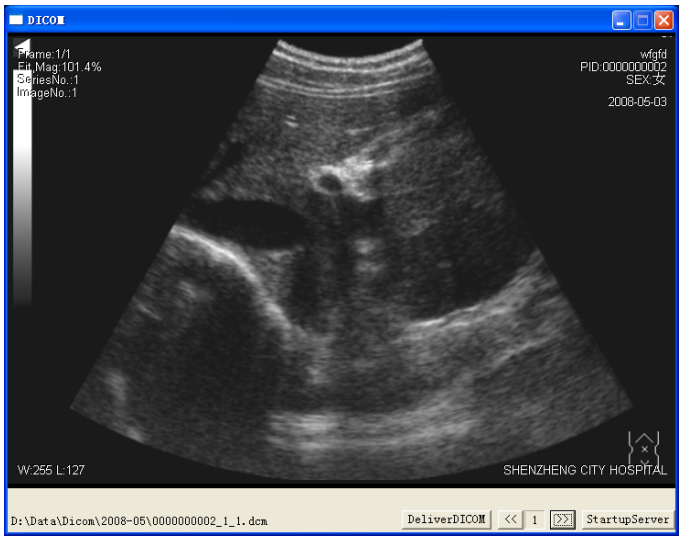
Delete : Click it to delete the selected case.

Typical : Click it to display the tree view for typical graphic and text case as follows. Choose a specific item of the typical case and the diagnosis result will be displayed in the dialogue box of case diagnosis. press Cancel and the diagnosis description of the typical case will be imported into the edit box of current case to facilitating the edition of the diagnosis text.


Typical Case
Typical Case
UserDefined TypicalCase
Normal Uterus Image
the cervix echo is slightly high, the slices to face to next can show vagina echo, central spirit line of this high echo, around this loiters a vagina wall.

Outport : Click it to save the current graphic and text case as a typical case to accumulate the typical case database.

Pull down the option box DICOM NoSave DI to choose if to save the DICOM pictures while saving the case. In general case, it is recommended to choose " not to save DICOM " for saving the memory space. However, if you need to save the DICOM pictures, you can choose the " save DICOM " Click DICOM to display the DICOM dialogue box to display to transmit the DICOM picture of the current case.



→ Click to display the next picture, while click ← to display the last picture backward.

DeliverDICOM Click to transmit the DICOM pictures to the selected server.

StartupServer Click to set this computer as a receiving server for DICOM picture transmission so it can receive the pictures from the other computers

Refer to “ 5.5 system setting ” for the settings of DICOM server port and IP address.

Recall the history case pictures: As the following picture,

Date	RsN
2008-4-15	126

when choosing a history case, the picture of the history case will be loaded to display in the picture view frame.

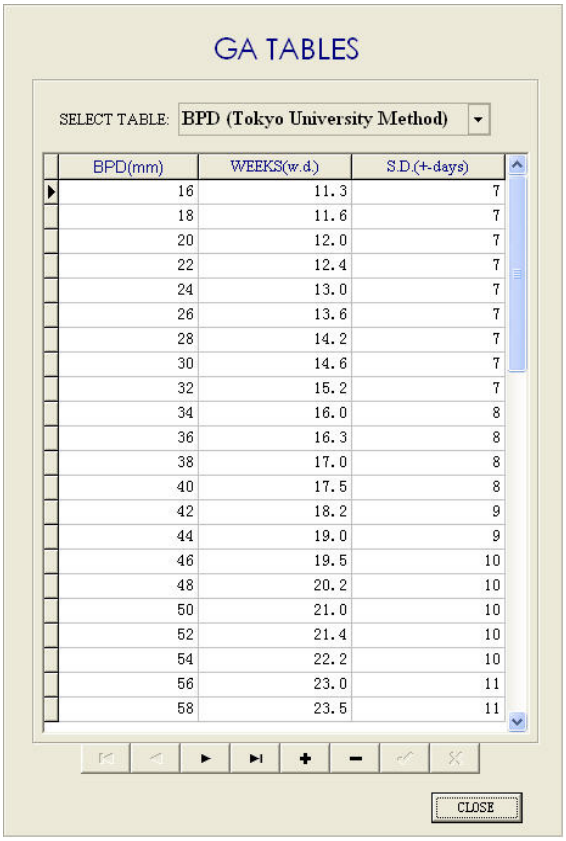
Close the dialogue box of case administration and set the picture in a freeze state, then the small pictures of the history case in the view frame can be dragged into the big picture display area for observation with the mouse.

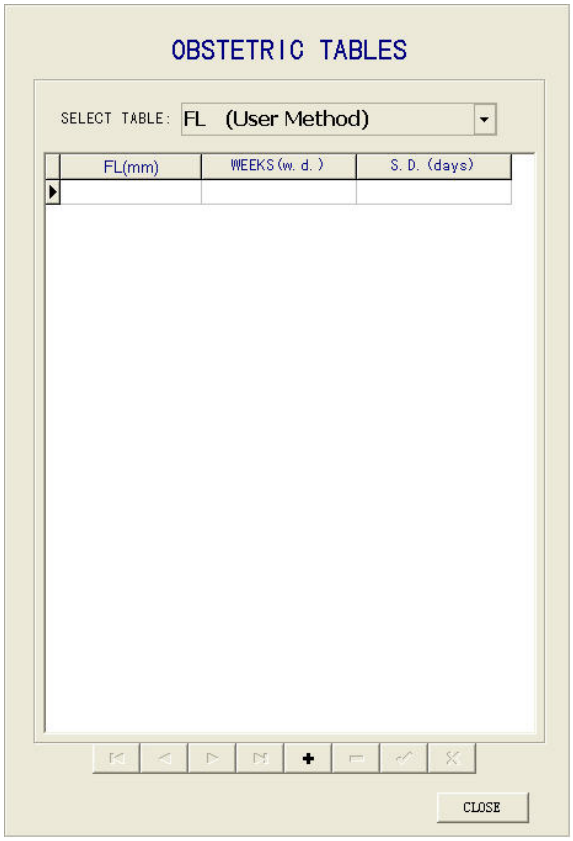
7.3 Calculation of EDC

The calculation requires the date of first day in the previous menstrual period provided by the patients, and the system defaults 40 weeks as the normal gestational period. Click ▼ button to select the time of previous menses, then the system will calculate the EDC automatically and display it after EDC.

7.4 Obstetric Tables and GA Tables Viewing

■press Measure, Choose 【ObstetricList】, then the following picture will be displayed:





Move the cursor to the top arrow

Move the cursor to the previous arrow

Move the cursor to the next arrow

Move the cursor to the bottom arrow

Add a new record

Delete the selected record

Save the edition

Cancel the edition

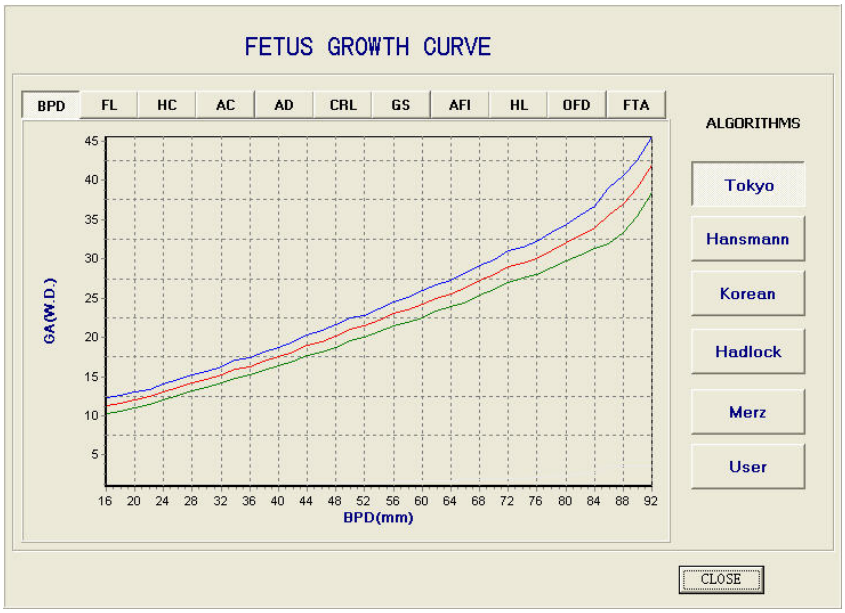
Select CLOSE to exit the GA tables.

Move the cursor to the appropriate obstetric tables and click it . 31 obstetric tables are provided by this instrument:

BPD(Tokyo Method)	AC(Hadlock Method)	HL(Hansmann Method)
BPD(Hadlock Method)	AC(Korean Method)	HL(Jeanty Method)
BPD(Korean Method)	AC(Merz Method)	HL(Osaka Method)
BPD(Hansmann Method)	AD(Hansmann Method)	OFD(Hansmann Method)
BPD(Merz Method)	CRL(Tokyo Method)	FTA(Osaka Method)
FL(Tokyo Method)	CRL(Korean Method)	
FL(Hadlock Method)	CRL(Hansmann Method)	
FL(Korean Method)	CRL(Robinson Method)	
FL(Merz Method)	GS(Tokyo Method)	
HC(Hadlock Method)	GS(Korean Method)	
HC(Korean Method)	GS(Hansmann Method)	
HC(Hansmann Method)	GS(Hellman Method)	
HC(Merz Method)	AFI(Korean Method)	

■press

, Choose 【ObstetricCurve】, then the following picture will be displayed :



There are 31 types of fetus growth curve provided by this system to the users for reference . Click CLOSE to exit the diagram.

Note: The misoperation, illegal shutting down by the users, or suffering a sudden impact may lead the malfunction of the system when the device is running. Thus the users should backup the important data (such as pictures and reports) into another storage device such as U disk and CD.

7.5 backup Patient information

■Data of patient in all the medical reports (including basic information, pictures, and diagnosis descriptions) is stored in D:\Data in 3 windows folders separately: Bmp folder, for Bmp images; Dicom folder, for Dicom images; JPG folder, for JPG images and welld.mdb files (containing patients ' information). The patient information can be backed up by copying the 4 files to other storage devices (copy to U disks or write into CDs).

7.5.1 Send the data to mobile memory

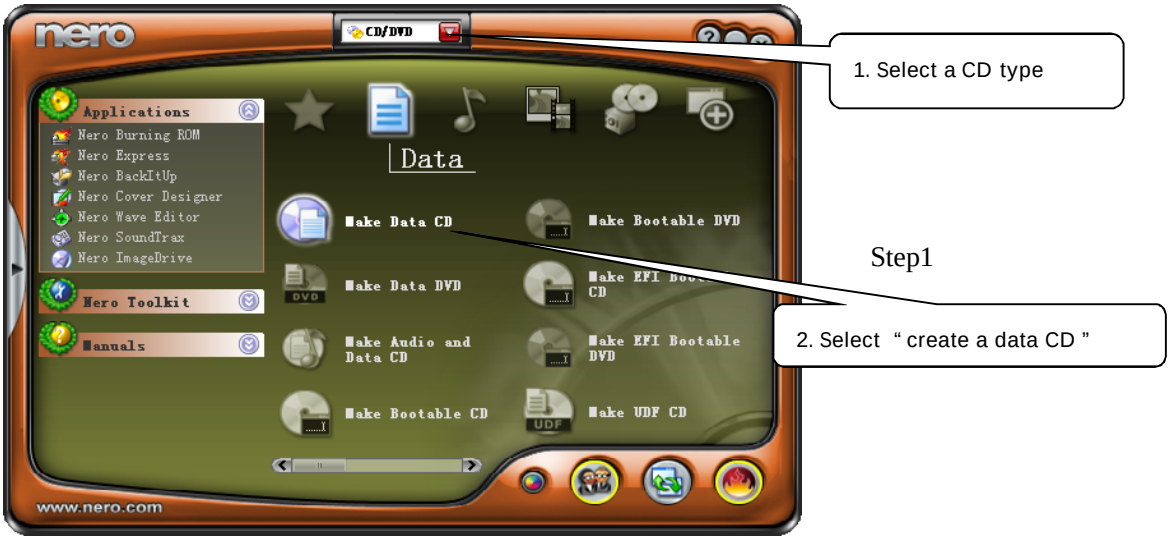
■Close the B ultrasonic software, and open windows folder D:\Data, as follows:

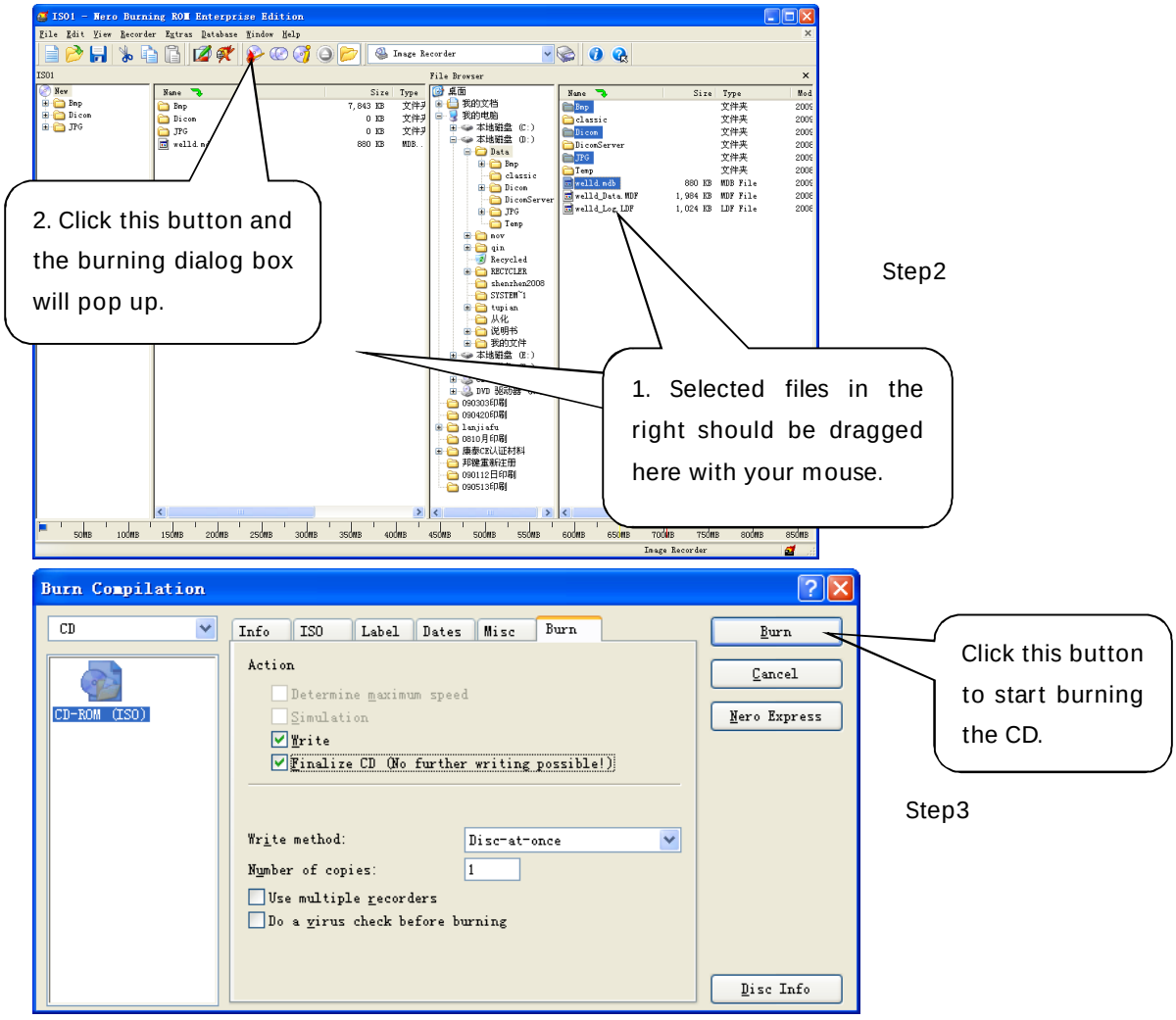
7.5.2 Write the data into CDs

Attention:
Check your CD writer to make sure that it has been connected to the computer. And ask your distributor for it if it is not available.

■Close the B ultrasonic software, and double click icon

on the windows desktop to start the CD burning software.




2. Click this button and the burning dialog box will pop up.
Step2
1. Selected files in the right should be dragged here with your mouse.
Burn Compilation
Click this button to start burning the CD.
Step3

■ The CD must not be ejected before the burning is finished. It will be ejected automatically after you click button Done in the right bottom of the window when the process is over.

Attention:
Make sure that patients ' data has been backed up before you replace disks or update/recover the system to avoid losing it.

7.6 Import patients ' data

Attention:
Make sure that you have already backed up patients ' data according to methods in 8.5.1 or 8.5.2 before importing the data.
Since Welld.mdb files contain all the text information of patients, they will get updated each time when a new record of patients is added or an alternation is made to medical reports. So that there are different demands in different situations for

importing, as follows:

1. When the disks are not replaced, all data in disk D will not change after you update/recover your system, and you can continue to use the data in disk D (old data of the patients). It ' s unnecessary for you to import or recover them in this case. If it is necessary to do so, make sure that no new records have been added and no alternation have been made to the medical reports before your importing the data (refer to following methods), or the added and altered data will be lost forever. Never forget about this, unless you don ' t want these new data.

2. When the disks has been replaced or formatted, take following measures to import backup data of patients: first, recover the system; second, copy corresponding 4 files (Bmp, Dicom, JPG, and Welld.mdb) in the CD or mobile memory to windows folder D:\Data to overwrite the original ones; third, run B ultrasonic software and press button New-Patient or select " Acquisition Management " >

to open medical reports management interface. After these steps, the software will import old data of the patients automatically and represent them in the list column on the left. Now you can alter, print the data or do other operations as you will.

7.7 Quick check and report printing

Press the button Save to collect the image , then press the button Report to enter into the interface of " casemanage " and fill in the patient information , exam , conclusion ;now press the button Print, you can print the report。

Note :■ If the measurement is finished , you must press the button New-Patient **to clean all data , then you can start the next inspection**

■ This method will not save the case information .

Chapter Eight Check and Maintenance

8.1 Check

Check the device power cord and probe cable and waterproof cover, if find any damage or breakage, must not use the device and replace the broken immediately.

8.2 Service life

Bases on the manufacturer ' s design, production related files, this model ' s use life is six years. The Product ' s material will gradually aging, if the product continually use over the designed use life, it may bring the problem of the performance reduced and fault rate raise.

Note
The Discard the device according to local law. Do not discard it mixing with other household garbage.

Warning
The manufacturer shall not assume the responsibility of risks caused by using the device beyond its service life.

8.3 Main unit maintenance

■ Instrumentation environment should accord with "3.1 operation environmental requirement".

■ If device enclosure needs cleaning , shutdown the device first and then wipe with alcohol sponges. Device should not turn on and off frequently.

■When the device does not work for a long time, pack the device according to the instructions on the packing. Store it properly in the warehouse. The storage environment should accord with " 9.1 Transportation and storage environmental requirements".

8.4 Probe maintenance

■ Probe is an expensive part and frangible. Never hit it or drop it on floor. When not working, place the probe in the box and set the probe at freeze state.

■ Please use medical ultrasound coupling gel during diagnoses. The water prevention level is IPX7, so do not let water exceed the acoustic window (see figure 8-1, 8-2, 8-3, 8-4, 8-5). Do daily inspection on the probe enclosure to see if it is cracked and avoid liquid leakage to spoil the inner components

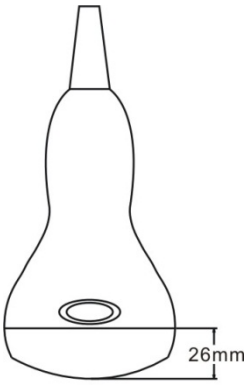


Figure 8-1. convex probe water-proof sketch

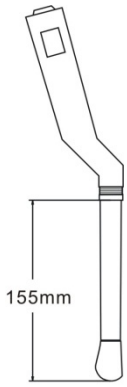


Figure 8-2. Endocavity probe water-proof sketch

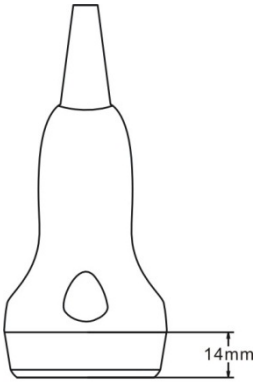


Figure 8-3. HF linear probe water-proof sketch

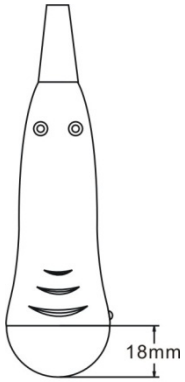


Figure 8-4. micro convex probe

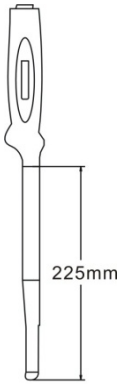


Figure 8-5. rectal probe water-proof sketch

■Probe is a site which will contact with the patient direct , thus it should be sterilized for every time after using to avoid the infection of virus. The diluted solution with an effective chloride content of 500mg/L,and which is made from 5% NaClO solution diluted by the water with a proportion of 1:100 ,can be used to wipe or spray onto the probe surface as a sterilizer, and the sterilizing time is 10 minute.

■ Once the probe is connected to the main unit, do not remove it at will to avoid poor contact.

Note
Probe might be damaged due to long time covered coupling gel.

Note
Clean the probe head after every use. Do not clean the probe with a surgical brash neither soft brash. Only soft cloth can be used to clean it.

Note
Do not press the probe on the patient too long to avoid discomfort.

Warning
1. Must not use extender, ethylene oxide or any other organic solvent which tend to deface the probe's protective foil. 2. Must not place the probe in liquid or detergent. 3. Must keep the equipment or probe from any type of liquid's infiltration. 4. Must not clean device or probe by airing or heating.

8.5 Cleansing

1.When the enclosure needs cleaning, wipe it with soft dry cloths and then wipe gently with sponge dipped with 75% medical alcohol .

2. When the inner part of the equipment needs cleaning, power off the equipment first and open the enclosure and vacuum it.

Warning
To prevent accidents, please power off the equipment when cleaning it or the probe.

Caution
1. Please refer to instructions prescribed by the manufacturer closely when using detergents. 2. Be careful with cleaning of the display, because it is very easy to scratch and spoil. Please wipe it with dry soft cloth. 3. Please do not clean the inner part of the device. 4. Please do not place the device in liquid. 5. Do not leave any detergent on the device surface. 6. Though there will be no chemical reaction between the device enclosure and most of those detergents, We still suggest no detergent in cleaning lest the device surface is spoiled.

8.6 Correct usage of probe

In order to prolong probe's service life and obtain optimum performance , follow these

instructions:

1. Periodic inspection on probe cable, socket and acoustic window.

2. Shutdown the device first and then connect or disconnect the probe.

3. Do not drop probe or flint body , and never hit the probe acoustic window, otherwise probe should be damaged.

4. Put the probe in the probe box when it is not in use.

5. Never heat the probe.

6. Never bend or pull probe cable, otherwise the internal connection should be broken.

7. Use coupling gel only on probe header and then clean probe.

8. Inspect probe acoustical window, enclosure and cable seriously after probe cleaning. Never use the probe again if any crack or breakage is found.

8.7 Instrument test and calibration

1.Check the leakage current of the device annually referring to the following data.

<table>
<tr><td colspan="3">Test Items</td><td>Standard Requirements</td></tr>
<tr><td rowspan="4">Continuous leakage current under normal temperature (uA)</td><td rowspan="2">Leakage current to Shell</td><td>Normal</td><td>≤100</td></tr>
<tr><td>Single Malfunction</td><td>≤500</td></tr>
<tr><td rowspan="2">Leakage current to Patient</td><td>Normal</td><td>≤100</td></tr>
<tr><td>Single Malfunction</td><td>≤500</td></tr>
<tr><td colspan="2">Dielectric endurance under normal temperature (V)</td><td>A- a_2</td><td>4000V/1min
No flashover
No breakdown</td></tr>
</table>

2. Test the software of obstetrics, area, and circumference measurement.

Chapter Nine Transportation and Storage

9.1 Environmental Requirements for Transportation and Storage

Environmental temperature: -5℃ ~ +40℃ Relative humidity: <80%

9.2 Transportation

All marks printed on the packing box are in accordance with the requirements of GB/T191-2008 <Packing, Storage and Transportation Marks>. Simple shockproof installations are made in the packing box, which adapt to voyage, railway, highway and steamship transportation. Avoid rain, inversion and impact.

9.3 Storage

■ When the device is stored for more than 6 months, take out the device from the packing box. Electrify the device for 4 hours, and then put the device into the packing box according to the instructions sated on the packing box. Do not crisscross/piling devices or keep the device to floor, wall and ceiling.

■ Keep the repository ventilative. Avoid direct sunshine and caustic gas.

Chapter Ten Malfunction Examination and Troubleshooting

10.1 Brief Introduction

■If there is any problem with The device, please refer to the failure diagnosis table in this chapter.

■The device has been subject to a strict quality inspection, thus most of the problems may be cause by a sudden change of the operating environment or unfinished system settings.

■The symptom, reason and solution of various malfunction are listed in the failure diagnosis table in this chapter.

■If any problem is encountered during the operation ,please refer to the failure diagnosis table first to see if it is listed in it .If it is , please do as the advised mean to resolve it ,while if the reason for the failure is not clear, please contact the user service department of Diagnostica.

10.2 Troubleshooting

■Replacement of fuse

Position the driver into the slot on the fuse cap and press it, then contra-rotate it to loose the cap. Take off the fuse tube (protective tube) and replace it then put back the cap and take the reverse measure to fix the cap and fasten it. Fuse specification:φ5×20, F2AL250V.

Troubleshooting (see the following diagram)

No.	Malfunction phenomena	Troubleshooting
1	Open power switch of the device, with no signal appeared on the screen and the indicator light is not on.	1. Examine power supply; 2. Examine supply line and plug; 3. Examine whether the fuse is burned-out; 4. Examine the lightness adjusting knob of the monitor.
2	Discontinuous striae and snow appear on the screen.	1. Examine power supply: strike fire interfere of the other devices; 2. Environmental examination: Electric and magnetic field interfere; 3. Examine power and probe plugs: whether they are well connected.

3	Image unclear	1. Adjust STC (General gain, near field and far field gain); 2. Adjust lightness and contrast potentiometer; 3. Clean light filter.
4	Near field image unclear	Adjust general gain and near field potentiometer on the front panel.
5	Far field image unclear	Adjust general gain and far field potentiometer on the front panel.

Appendix A

Acoustic output reporting table

B mode

Nominal frequency:3.5MHz

Trans ducer Model: C3-1/60R/3.5MHz

Index label			MI	TIS			TIB	TIC
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.85	0.98	-	-	-	(a)
Associated acoustic parameters	P_{ra}	(MPa)	1.46					
	P	(mW)		115.2	-		-	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$	(mW)				-		
	Z_s	(cm)				-		
	Z_{bp}	(cm)				-		
	Z_b	(cm)				-		
	Z at max. $I_{pi,\alpha}$	(cm)	5.30					
	d_{eq} (Z_b)	(cm)					-	
	f_{awf}	(MHz)	2.91	2.91	-	-	-	#
	Dim of A_{aprt}	X (cm)		1.64	-	-	-	#
		Y (cm)		1.30	-	-	-	#
Other information	t_d	(μsec)	0.52					
	prr	(Hz)	3787					
	p_r at max. I_{pi}	(MPa)	2.48					
	d_{eq} at max. I_{pi}	(cm)					-	
	$I_{pa,\alpha}$ at max. MI	(W/cm^2)	207.9					
Operating control conditions	F-PIN		1	1	-	-	-	#
	Power,%		80	80	-	-	-	#
	Angle,°		30	30				
	Focus position		7	7				

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

M mode(Inc B mode)

Nominal frequency:3.5MHz

Transducer Model: C3-1/60R/3.5MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.89	0.49	-	0.036-	0.11	(a)
Associated acoustic parameters	P_{ra}	(MPa)	1.51					
	P	(mW)		82.0	-		4.7	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					2.61		
	Z_s (cm)					2.94		
	Z_{bp}	(cm)				2.94		
	Z_b	(cm)					5.07	
	Z at max. $I_{pi,\alpha}$	(cm)	5.30					
	d_{eq} (Z_b)	(cm)					0.35	
	f_{awf} (MHz)		2.91	2.91	-	2.90	2.90	#
	Dim of A_{aprt}	X (cm)		2.35	-	2.34	2.34	#
		Y (cm)		1.30	-	1.30	1.30	#
Other information	t_d	(μsec)	0.53					
	prr	(Hz)	4166					
	p_r at max. I_{pi} (MPa)		2.58					
	d_{eq} at max. I_{pi} (cm)						0.34	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		203.9					
Operating control conditions	F-PIN		1	1	-	1	1	#
	Power,%		80%	80%	-	80%	80%	#
	Angle,°		30	30		30	30	#
	Focus position		7	7	-	7	7	#
	M Speed,S		1.25	1.25	-	1.25	1.25	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

B mode

Nominal frequency:5.0MHz

Transducer Model:C1-6/20R/5.0MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.64	0.19	-	-	-	(a)
Associated acoustic parameters	P_{ra} (MPa)		1.26					
	P (mW)			10.0	-		-	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp} (cm)					-		
	Z_b (cm)					-		
	Z at max. $I_{pi,\alpha}$ (cm)		2.98					
	d_{eq} (Z_b) (cm)						-	
	f_{awf} (MHz)		3.87	3.87	-	-	-	#
	Dim of A_{aprt}	X (cm)		0.52	-	-	-	#
		Y (cm)		0.79	-	-	-	#
Other information	t_d (μsec)		0.43					
	prr (Hz)		4784					
	p_r at max. I_{pi} (MPa)		1.87					
	d_{eq} at max. I_{pi} (cm)						-	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		117.2					
Operating control conditions	F-PIN		1	1	-	-	-	#
	Power,%		80	80	-	-	-	#
	Angle,°		90	90				
	Focus position		6	6	-	-	-	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

M mode(Inc B mode)

Nominal frequency:5.0MHz

Transducer Model: C1-6/20R/5.0MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.66	0.22	0.025	-	0.05	(a)
Associated acoustic parameters	P_{ra} (MPa)		1.29					
	P (mW)			11.6	1.35		1.35	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp} (cm)					-		
	Z_b (cm)						2.68	
	Z at max. $I_{pi,\alpha}$ (cm)		3.00					
	d_{eq} (Z_b) (cm)						0.31	
	f_{awf} (MHz)		3.86	3.86	3.88	-	3.88	#
	Dim of A_{aprt}	X (cm)		0.63	0.63	-	0.63	#
		Y (cm)		0.79	0.80	-	0.80	#
Other information	t_d (μsec)		0.43					
	prr (Hz)		4807					
	p_r at max. I_{pi} (MPa)		1.93					
	d_{eq} at max. I_{pi} (cm)						0.30	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		119.1					
Operating control conditions	F-PIN		1	1	1	-	1	#
	Power,%		80%	80%	80%	-	80%	#
	Angle,°		90	90	90	-	90	#
	Focus position		6	6	6	-	6	#
	M Speed,S		1.25	1.25	1.25	-	1.25	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

B mode

Nominal frequency:7.5MHz

Transducer Model: L3-1/7.5MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.54	0.64	-	-	-	(a)
Associated acoustic parameters	P_{ra} (MPa)		1.30					
	P (mW)			24.0	-		-	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp} (cm)					-		
	Z_b (cm)						-	
	Z at max. $I_{pi,\alpha}$ (cm)		4.9					
	d_{eq} (Z_b) (cm)						-	-
	f_{awf} (MHz)		5.70	5.70	-	-	-	#
	Dim of A_{aprt}	X (cm)		1.02	-	-	-	#
		Y (cm)		0.71	-	-	-	#
Other information	t_d (μsec)		0.28					
	prr (Hz)		5649					
	p_r at max. I_{pi} (MPa)		3.41					
	d_{eq} at max. I_{pi} (cm)						-	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		109.6					
Operating control conditions	F-PIN		1	1	-	-	-	#
	Power,%		80%	80%	-	-	-	#
	Focus position		3	3	-	-	-	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

M-mode(Inc B mode)

Nominal frequency:7.5MHz

Transducer Model: L3-1/7.5MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.56	0.60	0.029	-	0.045	(a)
Associated acoustic parameters	P_{ra}	(MPa)	1.34					
	P	(mW)		22.1	1.06		1.06	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp}	(cm)				-		
	Z_b	(cm)					2.47	
	Z at max. $I_{pi,\alpha}$	(cm)	4.90					
	d_{eq} (Z_b)	(cm)					0.20	
	f_{awf} (MHz)		5.70	5.70	5.70	-	5..70	#
	Dim of A_{aprt}	X (cm)		1.01	1.00	-	1.00	#
		Y (cm)		0.70	0.70	-	0.70	#
Other information	t_d	(μsec)	0.28					
	prr	(Hz)	5681					
	p_r at max. I_{pi} (MPa)		3.52					
	d_{eq} at max. I_{pi} (cm)						0.19	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		109.7					
Operating control conditions	F-PIN		1	1	1	-	1	#
	Power,%		80%	80%	80%	-	80%	#
	Focus position		3	3	3	-	3	#
	M Speed,S		1.25	1.25	1.25	-	1.25	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

B mode

Nominal frequency:6.5MHz

Transducer Model:EC1-1/13R/6.5MHz

Index label			MI	TIS			TIB	TIC
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.64	0.23	-	-	-	(a)
Associated acoustic parameters	P_{ra}	(MPa)	1.38					
	P	(mW)		10.0	-		-	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp}	(cm)				-		
	Z_b	(cm)				-		
	Z at max. $I_{pi,\alpha}$	(cm)	2.48					
	d_{eq} (Z_b)	(cm)					-	
	f_{awf} (MHz)		4.66	4.66	-	-	-	#
	Dim of A_{aprt}	X (cm)		0.63	-	-	-	#
		Y (cm)		0.79	-	-	-	#
Other information	t_d	(μsec)	0.31					
	prr	(Hz)	4807					
	p_r at max. I_{pi} (MPa)		2.05					
	d_{eq} at max. I_{pi} (cm)						-	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		120.1					
Operating control conditions	F-PIN		1	1	-	-	-	#
	Power,%		80	80	-	-	-	#
	Angle,°		120	120				
	Focus position		3	3	-	-	-	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

M-mode(Inc B mode)

Nominal frequency:6.5MHz

Transducer Model: EC1-1/13R/6.5MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.65	0.23	0.014	-	0.026	(a)
Associated acoustic parameters	P_{ra}	(MPa)	1.41					
	P	(mW)		10.2	0.62		0.62	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp}	(cm)				-		
	Z_b	(cm)					2.36	
	Z at max. $I_{pi,\alpha}$	(cm)	2.34					
	d_{eq} (Z_b)	(cm)					0.26	
	f_{awf} (MHz)		4.66	4.66	4.61	-	4.61	#
	Dim of A_{aprt}	X (cm)		0.62	0.62	-	0.62	#
		Y (cm)		0.80	0.79	-	0.79	#
Other information	t_d	(μsec)	0.31					
	prr	(Hz)	4807					
	p_r at max. I_{pi} (MPa)		2.05					
	d_{eq} at max. I_{pi} (cm)						0.25	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		124.1					
Operating control conditions	F-PIN		1	1	1	-	1	#
	Power,%		80%	80%	80%	-	80%	#
	Angle,°		120	120	120	-	120	#
	Focus position		3	3	3	-	3	#
	M Speed,S		1.25	1.25	1.25	-	1.25	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

B mode

Nominal frequency:7.5MHz

Transducer Model:EL3-1/7.5MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.84	0.78	-	-	-	(a)
Associated acoustic parameters	P_{ra}	(MPa)	2.06					
	P	(mW)		28.6	-		-	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp}	(cm)				-		
	Z_b	(cm)				-		
	Z at max. $I_{pi,\alpha}$	(cm)	2.50					
	d_{eq} (Z_b)	(cm)					-	
	f_{awf} (MHz)		5.96	5.96	-	-	-	#
	Dim of A_{aprt}	X (cm)		1.05	-	-	-	#
		Y (cm)		0.75	-	-	-	#
Other information	t_d	(μsec)	0.28					
	prr	(Hz)	5681					
	p_r at max. I_{pi} (MPa)		3.44					
	d_{eq} at max. I_{pi} (cm)						-	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		231.1					
Operating control conditions	F-PIN		1	1	-	-	-	#
	Power,%		80	80	-	-	-	#
	Focus position		3	3	-	-	-	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

Acoustic output reporting table

M-mode(Inc B mode)

Nominal frequency:7.5MHz

Transducer Model:EL3-1/7.5MHz

Index label			*MI*	*TIS*			*TIB*	*TIC*
				Scan	Non-scan		Non-scan	
					$A_{aprt} \leq 1cm^2$	$A_{aprt} > 1cm^2$		
Maximum index value			0.83	0.72	0.021	-	0.042	(a)
Associated acoustic parameters	P_{ra}	(MPa)	2.03					
	P	(mW)		26.4	0.78		0.78	#
	Min.of $[P_\alpha(z_s), I_{zpta,\alpha}z_s)]$ (mW)					-		
	Z_s (cm)					-		
	Z_{bp}	(cm)				-		
	Z_b	(cm)					2.08	
	Z at max. $I_{pi,\alpha}$	(cm)	2.50					
	d_{eq} (Z_b)	(cm)					0.21	
	f_{awf} (MHz)		5.96	5.96	5.96	-	5.96	#
	Dim of A_{aprt}	X (cm)		1.05	1.04	-	1.04	#
		Y (cm)		0.75	0.75	-	0.75	#
Other information	t_d	(μsec)	0.28					
	prr	(Hz)	5681					
	p_r at max. I_{pi} (MPa)		3.39					
	d_{eq} at max. I_{pi} (cm)						0.20	
	$I_{pa,\alpha}$ at max. MI (W/cm^2)		240.0					
Operating control conditions	F-PIN		1	1	1	-	1	#
	Power,%		80	80	80	-	80	#
	M speed,s		1.25	1.25	1.25		1.25	
	Focus position		3	3	3	-	3	#

Notes:

(a) This probe is not intended for transcranial or neonatal cephalic use;

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